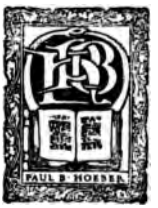
DIABETES

A HANDBOOK FOR PHYSICIANS
AND THEIR PATIENTS

BY

PHILIP HOROWITZ, M.D.

WITH TWENTY-SEVEN TEXT ILLUSTRATIONS
AND TWO COLORED PLATES



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THIS BOOK IS AFFECTIONATELY

DEDICATED

TO THE MEMORY OF

H. HOLBROOK CURTIS, M.D.

AS A MARK OF ESTEEM FOR HIS

MANY COURTESIES AND HELPFUL ADVICE

PREFACE

In offering this book to the profession, the author's aim has been to bring about more intelligent cooperation between doctor and patient. The book is not intended in any way to supplant the doctor. It is the height of folly for diabetics to attempt to treat themselves.

Scientific accuracy in the prescription of diets and in their adjustment to the dietetic idiosyncrasies of patients, is the keynote to success in the treatment of diabetes. In actual practice, the author specifies each article of food, and the exact amount which is to be eaten during a certain period. Through careful observation and experimentation, the physician may in this way test the action of certain foods or combinations of foods upon each patient until he is able to determine which diet is best adapted to the individual's needs. A diet equilibrium may thus be arrived at.

In this book, instead of simply mentioning the various forms of food permissible under certain conditions, the author has given in concrete

form the daily regimen and has attempted to illustrate the treatment by detailed case reports. The book is, therefore, schematic in character and the treatment as outlined must be adjusted to suit the needs of each case. The essential points, however, should be covered in any comprehensive handling of diabetes. The menus and recipes, which can be modified to suit individual needs, have been tried out in the author's own practice and have been found of value. The tables showing the analysis of foods are of value in the working out of a carefully adjusted diet.

Statistics show that the mortality of diabetes was three times as great in 1910 as it was in 1880. The treatment here outlined is built upon the supposition that the underlying causes of the weakened functioning of the pancreas is an intestinal toxemia, as explained in the introductory chapter. This belief is based upon researches in which the writer is now engaged, complete findings of which will be reported at an early date. In the meantime, if this book aids in the reduction of the mortality of diabetes the author feels that he will be amply repaid for the labor and time expended thereon.

The author wishes to thank the publisher, Mr. Paul B. Hoeber, for many useful suggestions, and for the careful manner in which he and his staff have prepared this volume. He also wishes to express his appreciation to his secretary, Miss Sylvia Carter, for her help in preparing the copy and reading proof.

PHILIP HOROWITZ.

NEW YORK,
June, 1920.

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DIABETES

A Handbook for Physicians and Their Patients

CHAPTER I

GENERAL CONSIDERATIONS

Before considering the treatment of diabetes, it is advisable to study the nature of the disease. The term "diabetes" implies a condition in the human economy which renders the individual incapable of tolerating or properly utilizing the carbohydrates (starches, sugars, etc.) taken with food, without their appearing in the urine as dextrose or glucose.

Not every condition, however, in which sugar appears in the urine can be taken as an indication of diabetes. For example, glycosuria may often appear temporarily after the ingestion of extremely large quantities of sugar or candy (alimentary glycosuria), and it is often found as an accompaniment to injuries, apoplectic attacks, epileptic seizures, gout, Grave's disease, the ingestion of mineral poisons or other con-

ditions. In such cases the glycosuria usually disappears with the elimination of the conditions which induced it. These cases should be closely watched, however, since a true diabetes often begins as a transitory glycosuria which comes and goes before finally establishing itself. Only when the glycosuria has become fixed is the case to be classed as true diabetes.

Practically all investigators have reported a statistical increase in deaths from diabetes between 1880 and 1900—a condition which is especially evidenced in centers where vital statistics have been carefully kept. In 1910 the mortality from this cause was between three and four times as great as that of 1880. Joslin[1] has given a very complete and exhaustive résumé of the statistics relating to the mortality from diabetes in the various centers—New York, Boston, Paris, etc.; his figures show a fourfold increase between 1880 and 1910.

In about 13 per cent. of Joslin's own cases, the patient's father or mother (or both) were also affected, while in 7 per cent. some other

[1] Joslin, Treatment of Diabetes Mellitus. Philadelphia: Lebiger, 1917, p. 19–27.

relative was known to have had diabetes. This makes a total of 20 per cent. in which an hereditary tendency could be traced. Barker[1] likewise gives 20 per cent. as the average number of cases which show a history of diabetes in the family as also does Elsner.[2] In a series of 360 cases, the writer finds 11 per cent. of the patients had one or both parents affected, while in 14 per cent. of the cases some distant relative was reported as having the disease, making 25 per cent. of the total cases which showed hereditary tendency.

Improved methods of treatment have already lowered the mortality of diabetes since 1910. With the exception of an occasional absolute diabetic (an individual with no carbohydrate tolerance, who produces sugar from proteins and fats as well as carbohydrates), the majority of patients can be kept sugar-free and have their lives prolonged with comparatively little trouble. To accomplish this, however, these patients should have constant care; they should

[1] Barker, Monographic Medicine. New York: D. Appleton & Co., 1916, vol. iv, p. 800.

[2] Elsner, Monographic Medicine. New York: D. Appleton & Co., 1916, vol. iv, p. 110.

refrain at all times from digressions in diet. Under this treatment individuals will probably not put on any weight and will even be slightly under normal. This condition is necessary, however, for it is found that with rapid increase in weight, the sugar invariably returns. Only sufficient food should be eaten to insure adequate repair without over-loading the system with surplus material which will be converted into fat. Excessive food intake will invariably add additional strain to the weakened digestive organs.

It is generally conceded today that diabetes is due to the weakened functioning of the pancreas, but the cause of this weakened functioning has not yet been determined.

Researches have led the writer to conclude that diabetes and other forms of metabolic disturbance, such as nephritis, arteriosclerosis gout, etc., are the result of an auto-intoxication, causing an interference with the function of the ductless glands or irritation of these and other organs.[1] The organs most affected will show the

[1] Horowitz, Treatment of Diabetes. *New York M. J.*, Aug. 8th. 1914. (The author also bases his conclusions on animal experimentation which will be reported later.)

train of symptoms peculiar to their perverted functions.

In diabetes there is an interference with the proper functioning of the thyroid, pancreas, liver, adrenals and other organs which serve as sugar-regulating apparatus (Von Norden); this results in the creation of a glycosuria. If this irritation is permitted to continue for a long time an actual tissue destruction results, such as the degeneration of the islands of Langerhans in the pancreas—a condition found in most cases of diabetes which come to autopsy. In the mild cases only an irritation of the organs exists; with this condition removed, the patient is able to return to an almost normal diet If the toxemia has been very severe or of long standing, and the organs have been severely injured, the most serious forms of the disease are found to obtain.

The same holds true for the other forms of metabolic disturbance. In nephritis we have an irritation and destruction of different parts of the kidney. The severity and rapidity of this irritation determine whether the secreting cells (parenchyma) are affected, or whether there is a deposition of connective tissue between the

parenchyma. The first condition is termed a parenchymatous, the second, an interstitial form of nephritis. In arteriosclerosis the toxin, or toxins, cause an irritation or destruction of parts of the intima (the innermost coat of the blood-vessels) and the deposition of lime salts serves to strengthen the vessel wall.

In a severe auto-intoxication, the liver is usually found enlarged and swollen; its functions, in consequence, are interfered with owing to the swelling of the secreting cells. The liver has numerous functions, the most prominent of which are: first, the conversion of sugar into glycogen and the storing of it for the use of the body; second, the secretion of bile; and third, by its biochemic action, the conversion of toxins into inert and harmless substances—indol, a highly putrefactive gas, into indoxyl-sulphate or indican. In cases of severe auto-intoxication, the liver has to bear the brunt of the toxemia, for the blood which carries the toxins from the abdominal viscera passes through the liver by way of the portal vein before reaching the right side of the heart through the inferior vena cava. When very potent toxins are present the secret-

ing cells of the liver are irritated and swell thereby causing an enlargement of the entire organ. As a result, this function of the liver is interfered with and many toxins are permitted to get into the general circulation. The presence of the toxins in the blood causes an irritation of the entire body, including the ductless glands.

If the irritation is of short duration, general symptoms of toxemia prevail, such as general malaise, headache, anorexia, etc. When the irritation is removed, the symptoms disappear. If this condition is very severe or prolonged, a destruction of those organs which are unable to withstand the irritant effect of the poisons or toxins results, and a definite morbid state is induced. The development of diabetes in one case and nephritis, or circulatory disturbances in another, depends upon the particular organs or set of organs which are affected.

The kidney, liver and other endocrine organs may also become diseased by the specific action of mineral or bacterial poisons, as after the ingestion of mercury, phosphorous, arsenic or alcohol, or as an accompaniment of erysipelas, typhoid, scarlatina and other febrile diseases. The patho-

logy under these conditions, is similar to that described above. However, in this instance, the irritation and destruction of the tissue is caused by a mineral or bacterial instead of an organic toxin formed from the putrefaction of the partially digested food or the amino-acids.

The average patient, with the advice of his physician, can follow out the treatment for diabetes comprehensively and thoroughly. The tests for sugar, acetone and diacetic acid in the urine are so simple that it is an easy matter for anyone to carry them out. Details of the tests are given in the chapter on tests.

To simplify the consideration of its treatment, true diabetes may be divided into the following groups:

Group A. Simple cases in which the glycosuria disappears on eliminating sugar from the food and cutting down the starches. (Usually these cases are accidentally discovered by insurance companies.)

Group B. Moderately severe cases, in which acetone may or may not be present in the urine. The condition is accompanied by loss of flesh, thirst and polyuria.

Group C. Severe cases associated with an acidosis and probably complicated with Bright's disease, neuritis and eye symptoms.

Group D. Very severe cases in which the tolerance is very poor, accompanied by marked acidosis. The complications here are serious and dangerous—threatened coma, marked retinal hemorrhage, diminuition or loss of vision, or gangrenous involvement.

Group E. Juvenile diabetes occurring in children of all ages up to and including adolescence.

One of two views, I have found, is held by the average patient regarding diabetes. First, a certain number of patients believe that diabetes is a practically hopeless condition, and that those afflicted with it can never expect to become sugar-free or have their tolerance improved. This point of view leads to the belief that it is useless to take precautions or to do anything to ameliorate the condition. The course of the disease in patients holding this opinion is rapid and progressive since they make no effort to help themselves.

Second, another class of patients, while believing diabetes to be incurable, observe that,

notwithstanding this fact, diabetics are often long-lived. Accordingly, they are satisfied with merely abstaining from sugar from time to time or reducing the diet temporarily. As a rule, persons of this class have a diabetic condition associated with arterial changes, nephritis, eye complications and gangrene.

The necessity for studying the psychology of the patient cannot be too strongly emphasized. Treatment must be administered for the "state of mind," as well as for the diabetic condition. Above all, the physician should obtain the full confidence of his patient.

Patients often tell of being treated by a physician, who advised appropriate treatment, but who lost their confidence by giving orders in a hesitating, uncertain manner. Instead of telling his patients, "Here is your diet, you must eat only what is written on this list; nothing has been omitted that you may have or can tolerate;" he would say, "I think you might try this diet," and subsequently weaken his position by adding, "You might also try something else." In this case the patient is left in an uncertain frame of mind.

Most patients are eager to learn all there is to be known about the etiology, prognosis, and treatment of diabetes; and the more intelligent have read one or more books on the subject, so that they appraise the physician at the first visit.

Some physicians are unable to keep their patients sugar-free on certain diets, while others find no difficulty in eliminating the glycosuria. The failure in the first case is usually due to lack of proper attention to accuracy and detail in prescribing the diet. When a patient is given a diet calling for 120 grams of chicken, or 900 grams of vegetables, that amount only, and *no more*, should be eaten. Patients will often stop weighing and measuring their food, because of the trouble it entails, trusting to their supposed ability of gauging the proper amounts with their eyes. Disastrous results usually follow any deviation from this rule. Another point not to be overlooked is—that the instructions apply to the weight of foods after they are cooked, *not* in the raw state. An appreciable source of error arises from a misinterpretation of the terms employed. In the diet tables given in this book the term "level tablespoonful" is used. Patients

must be warned that this instruction must be followed literally; a "heaping tablespoonful" taken under such conditions may cause a recurrence of glycosuria.

Patients who believe diabetes to be a hopeless condition are necessarily depressed. This belief must be dispelled. Patients must be brought to realize that the presence or absence of glycosuria rests practically with them; the glycosuria can be eliminated, the tolerance improved, and the diet increased, provided they adhere faithfully to the strict rules and regulations.

Those patients who abstain from sugars and starches only when glycosuria reappears, should be impressed with the fact that chronic diabetes may eventually lead to nephritis, neuritis, blindness, and gangrenous involvement and that serious results may follow even the slightest deviation from the hard and fast rules laid down.

The idiosyncrasies of each patient must be carefully studied. Articles of food that disagree with a patient at one time may agree later. If glycosuria should reappear, however, under a certain diet, the patient should not be permitted to become discouraged.

To obtain proper cooperation it is advisable to tell the patient his *exact* condition. A patient who understands his case will obey orders more strictly and intelligently than one who does not.

It is therefore necessary:

(1) To inspire the patient with confidence.

(2) To insist upon the fact that diabetes is not a hopeless condition; that while the patient may have to remain on a restricted diet for the balance of his life, nevertheless, his life will be prolonged, and he will live easily with comparatively slight discomfort.

(3) To see that the patient exercises care and accuracy in weighing and measuring his food.

(4) To insist that the patient should under no condition break this diet without consulting his physician.

(5) To impress upon the patient that if he wishes to avoid blindness, neuritis, kidney complications, gangrene, and coma, he must PERSEVERE and adhere to his treatment.

Patients should keep a daily record of the food permitted with the quantities and caloric values. In this way they will become acquainted with

the method of treatment, and will learn what food and combinations of food they can tolerate. If they should develop a glycosuria, they will be able to recognize what food or foods have disturbed the equilibrium, and can readily tell whether the disturbance is due to an increase in proteids, carbohydrates or fats. In this manner they will be able to compare a new diet with one which they have taken before and tolerated. They will also be able to adjust any increase in diet so that the offending substance (whether it be carbohydrate, proteid, or fat) will be kept at a low level or at least increased very slowly.

The following charts, which are self explanatory, were designed by a diabetic. By means of these charts a patient can keep a record of his *daily* intake, and can estimate the caloric value of each meal. On the back of this card a record of the urine analysis, blood sugar, blood pressure, etc., is to be kept.

The choice of foods that enter into the formulating of diets of certain caloric values, should not be left to the discretion of either the nurse or patient. The nurse may not be able to detect the idiosyncrasy of the patient; the patient may

NAME ..... DATE ..... DAY ..... DAYS TREATED ..... NO. .....

TOTAL WEIGHT	FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT	CAR	PRO	FAT	CALS	LUNCH WEIGHT	CAR	PRO	FAT	CALS	SUPPER WEIGHT	CAR	PRO	FAT	CALS
	TOTAL GRAMS																			
	MULTIPLY FOR CALORIES	4	4	9			4	4	9			4	4	9			4	4	9	
	TOTAL CALORIES																			

FIG. 1.—RECORD CHART SHOWING DAILY FOOD CONSUMPTION INCLUDING THE EXACT QUANTITIES AND CALORIC VALUES OF EACH MEAL.

DAILY AND WEEKLY SUMMARY

DATE	DAY	DIET GRAMS CARBOHYDRATE	PROTEIN	FAT	CALORIES	WT IN LBS.	URINE A.M. SAMPLE SUGAR	DI-ACETIC ACID	ACETONE	ALBUMEN	URINE P.M. SAMPLE SUGAR	DI-ACETIC ACID	ACETONE	ALBUMEN	BLOOD SUGAR	BLOOD PRESSURE	MEDICINE	MEDICINE
		LABORATORY ANALYSIS																

REMARKS .....

FIG. 2.—REVERSE SIDE OF CHART SHOWN IN FIG. 1.

choose the food he likes best as long as it has the definite number of grams of carbohydrates, proteids, and fats, irrespective of whether he can tolerate it or not. Not all patients can tolerate everything that appears in the various tables and menus.

Many cases cannot tolerate grape fruit, a 5 per cent. fruit, with an available carbohydrate content of 3 per cent. whereas, they can tolerate heavy gluten bread with the same carbohydrate content, and an even higher carbohydrate content than grape fruit. Others have an intolerance for cream cheese, and such small quantities as ½ to 1 ounce have caused a recurrence of the glycosuria. These same patients often cannot tolerate bread made of casein flour.

Quite often, it is found that a patient can tolerate a certain diet when it is made up of the 5 per cent. vegetables, but he cannot tolerate the same amount of carbohydrates when the diet consists of a mixture of the 5 and 10 per cent. vegetables. A patient sometimes presents himself with diet prescriptions calling for a definite number of grams of carbohydrates, proteids and fats, which he cannot tolerate, although they seem

correct for his condition. The cause of this intolerance may be due either to improper food with the correct amounts of proteids, carbohydrates and fats, or to proper food for which the patient has an idiosyncrasy.

It is therefore not enough to give the patient a diet of a definite caloric value, but the articles of food that enter into it must be tested out to see whether the patient can tolerate them or not.

All prescriptions calling for definite amounts of carbohydrates, proteid and fat and of a definite caloric value, should also specify the various articles of food that go to make up the amount, and the choice of food should not be left to the discretion of the nurse or patient.

Many intelligent patients are difficult to handle after they have grasped the fundamentals of treatment. The impression will be found to have taken root that all that is necessary for continued relief is a set of rules, and a desire and ability to follow them. The value of the rules depends entirely upon their adjustment to the individual case, and it is only under the continued directions of a physician that good results can be maintained.

Differential Diagnosis. The first essential of successful treatment is, of course, correct diagnosis. It cannot be too strongly emphasized that *sugar in the urine does not always signify diabetes.* Based upon such insufficient findings we often discover patients undergoing treatment for diabetes mellitus with discouraging results. A more careful examination would have revealed that these cases were probably of renal origin. In all instances of suspected diabetes a *complete* physical and clinical examination *must* be made. The omission of any one test may throw the physican off the scent. *It is as important to examine the blood as the urine.*

CHAPTER II

MILD DIABETES

Very often sugar is discovered accidently by life insurance examiners or in the course of a routine urine analysis; the patients have previously shown no symptoms indicating diabetes and have considered themselves in perfect health. These patients are usually normal in weight, do not complain of either thirst or polyuria, and may even have gained weight for a year or two prior to the discovery of sugar.

Such patients are usually those who have been very busy or over-worked and have been inclined to over-eat while not taking sufficient exercise.

The sugar output may vary from a fraction of 1 per cent. to 2 or 3 per cent. Usually there is no acidosis or albuminuria.

Most cases of this type have a fairly marked indicanuria and only a slight hyperglycemia. It is rare that such patients have a hyperglycemia of 0.20 per cent. or higher; in most cases, if the fact of the glycemia had not been called to their attention, they would have considered themselves in perfect health.

The following cases exemplify this type of diabetes.

CASE 304, T. A. McK. A native of the United States. Family history negative. Present trouble dates back three years, when sugar in the urine was found by the life insurance examiner. When first seen by the writer, February, 1918, the patient had lost neither strength nor flesh and had no headache. Sight perfect; bowels in good condition. The only complaint—a dizziness—always occurred on getting up suddenly or lying down. Examination showed the patient apparently in good health; weight 206 pounds; blood pressure 170; liver enlarged, the anterior edge being 5 cm. below the free border of the ribs. Urine examination showed a trace of sugar, and 2 plus indican, otherwise it was negative. Blood sugar, 0.17 per cent.

CASE 355. A. J. Age 51. Spaniard. Family history negative as to diabetes. One brother died of tuberculosis. Patient never very ill, except for frequent colds. Had been perfectly well up to about three weeks before he went to see his physician with reference to a severe cold and laryngitis. In the course of the routine

urine examination 0.63 per cent. of sugar and a trace of acetone were found. A small amount of indican was also present in the urine, but no albumin. The blood examination showed 0.15 per cent. sugar.

CASE 328. F. C. Age 17. Canadian. Family history, also personal history, negative. When first seen in November, 1918, he was perfectly well. He had applied for a life insurance policy, but had been refused on account of sugar in the urine. The patient had not been losing strength or flesh, did not tire easily, was not thirsty, and did not report polyuria. On inspection he looked perfectly well. The physical examination of the body disclosed nothing unusual. Weight 126¼ pounds. Urine examination showed a trace of sugar and 3 plus indican. Blood sugar, 0.20 per cent.

Not only must something be done for the glycosuria, but considerable influence must be brought to bear upon the mental state. Usually marked physical depression exists, and it is essential to restore such patients to a proper equilibrium before much can be accomplished.

In mild cases, I have found that much can be

TABLE I.—TABLE OF FOODS WITH THEIR CARBOHYDRATE CONTENT (JOSLIN)

VEGETABLES (fresh or canned)			
5 %*	10 %*	15 % ±	20 % ±
Lettuce	Pumpkin	Green Peas	Potatoes
Cucumbers	Turnip	Artichokes	Shell Beans
Spinach	Kohl-Rabi	Parsnips	Baked Beans
Asparagus	Squash	Canned Lima Beans	Green Corn
Rhubarb	Beets		Boiled Rice
Endive	Carrots		Boiled Macaroni
Marrow	Onions		
Sorrel	Mushrooms		
Sauerkraut			
Beet Greens			
Dandelion Greens			
Swiss Chard			
Celery			
Tomatoes			
Brussels Sprouts			
Water Cress			
Sea Kale			
Okra			
Cauliflower			
Egg Plant			
Cabbage			
Radishes			
Leeks			
String Beans			
Broccoli			

FRUITS			
Ripe Olives (20 %) fat	Oranges	Apples	Plums
Grape Fruit	Cranberries	Pears	Bananas
Lemons	Strawberries	Apricots	Prunes
	Blackberries	Blueberries	
	Gooseberries	Cherries	
	Peaches	Currants	
	Pineapple	Raspberries	
	Watermelon	Huckleberries	

NUTS			
Butternuts	Brazil Nuts	Almonds	Peanuts
Pignolias	Black Walnuts	Walnuts (Eng.)	
	Hickory	Beechnuts	40 %
	Pecans	Pistachios	Chestnuts
	Filberts	Pine Nuts	

MISCELLANEOUS	
Unsweetened and Unspiced Pickle	* Reckon available carbohydrates in vegetable of 5 % group as 3 %, of 10 % group as 6 %
Clams	
Scallops	
Fish Roe	
Oysters	
Liver	

30 GRAMS (1 OZ.) CONTAIN APPROXIMATELY	CARBOHYDRATES G.	PROTEIN G.	FAT G.	CALORIES
Oatmeal dry weight.....	20	5	2	120
Cream, 40 per cent.....	1	1	12	120
Cream 20 per cent.....	1	1	6	60
Milk.....	1.5	1	1	20
Brazil Nuts.....	2	5	20	210
Oysters, six.....	4	6	1	50
Meat (uncooked, lean)...	0	6	3	50
Meat (cooked, lean).....	0	8	5	75
Bacon.....	0	5	15	155
Cheese.....	0	8	11	130
Egg (one).....	0	6	6	75
Vegetables 5 per cent. group	1	0.5	0	6
Vegetables 10 per cent.	2	0.5	0	10
Potato.....	6	1	0	30
Bread.....	18	3	0	90
Butter.....	0	0	25	225
Oil.....	0	0	30	270
Fish, cod, haddock (cooked)	0	6	0	25
Broth.....	0	0.7	0	3
Small Orange or ½ Grape Fruit.....	10	0	0	40

1 gram protein, 4 calories.
1 gram carbohydrate, 4 calories.
1 gram fat, 9 calories.
1 gram alcohol, 7 calories.
6.25 grams protein contain 1 gram nitrogen.

1 kilogram = 2.2 pounds.
30 grams (g) or cubic centimeters (c.c.) = 1 ounce.
A patient at rest requires 25 calories per kilogram body weight: approximately 1 calorie per kilo. per hour.

accomplished by reducing the diet to a point lower than that which the patient can readily tolerate. I usually prescribe the following diet which is schematic of course and must be varied to suit the individual.

Diet No. 1 (24-hour Content)

600 grams (20 oz.) of 5 per cent. green vegetables

3 eggs, boiled 20 minutes

540 c.c. (3 cups) black coffee

540–720 c.c. (3–4 cups) of chicken broth

60–120 grams (2–4 oz.) white meat of chicken

Plenty of clear water.

(I usually leave the apportionment of meals to the patient, merely suggesting the arrangement which follows.)

Breakfast

1 hard-boiled egg

About 240 grams (8 oz.) 5 per cent. green vegetables—such as spinach, string beans or cauliflower

180 c.c. (6 oz.) black coffee

180 c.c. (6 oz.) chicken broth

Midday Meal

1 hard-boiled egg

60–120 grams (2–4 oz.) white meat of chicken

180 c.c. (6 oz. or 1 cup) black coffee

180 c.c. (6 oz. or 1 cup) chicken broth

240 grams (8 oz.) of 5 per cent. green vegetables

Lunch (*At* 3 *p. m. or* 10 *p. m.*)

180 c.c. (6 oz. or 1 cup) chicken broth or black coffee

Supper

Same as breakfast.

The accompanying charts show the distribution of these diets for the various meals, with the equivalent caloric values.

NAME Diet No. 1 DATE DAY DAYS TREATED NO.

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
20	oz	5% Vegetables	20	10	0	120	7	oz	7	3½	0	42	7	oz	7	3½	0	42	7	oz	7	3½	0	42
3		Eggs	0	18	18	234	1		0	6	6	78	1		0	6	6	78	1		0	6	6	78
3	oz	Black coffee	0	0	0	0	1	oz	0	0	0	0	1	oz	0	0	0	0	1		0	0	0	0
3	-	Broth	0	0	0	0	1	-	0	0	0	0	1		0	0	0	0	1		0	0	0	0
4	oz	Chicken (breast)	0	32	20	308							4	oz	0	32	20	308						
		TOTAL GRAMS	20	60	38	662			7	3½	6	120			7	41½	26	420			7	9½	6	120
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	80	240	342	662			28	38	54	120			28	166	234	420			28	38	54	120

FIG. 3.—DIET NO. 1.

With this diet the patient will usually become sugar-free in 48 hours and the blood sugar will drop down to 0.12 or 0.13 per cent. and even lower. After the urine has become sugar free I allow:

Diet No. 2

800–900 grams (27–30 oz.) of 5 per cent. green vegetables

540 c.c. (3 cups, 6 oz. each) of coffee

540–720 c.c. (3–4 cups) of broth

120 grams (4 oz.) white meat of chicken

120 grams (4 oz.) plain boiled fish.

NAME DIET No. 2 DATE DAY DAYS TREATED NO.

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
27	oz	5% Vegetables	27	15	0	168	9	oz	9	4	0	54	9	oz	9	4	0	54	9	oz	9	4	0	54
3		Eggs	0	18	18	234	2		0	12	12	156	0		0	0	0	0	1		0	6	6	78
3		Black Coffee	0	0	0	0	1		0	0	0	0	1		0	0	0	0	1		0	0	0	0
3		Broth	0	0	0	0	1		0	0	0	0	1		0	0	0	0	1		0	0	0	0
4	oz	Chicken (breast)	0	32	20	308							4	oz	0	32	20	308	0		0	0	0	0
4		Plain boiled fish	0	24	0	96													4	oz	0	24	0	96
		TOTAL GRAMS	27	87	38	800			9	16	12	210			9	36	20	362			9	34	6	228
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	108	350	342	800			36	66	108	210			36	146	180	362			36	136	54	228

Fig. 4.—Diet No. 2.

Should the patient feel somewhat weak, I allow 30–45 c.c. (1–1½ oz.) of whiskey per day. I prefer, however, not to give any alcohol at all.

This diet should be kept up for two or three days, depending upon whether the patient has a high or low sugar index and hyperglycemia at the beginning.

During this period attention must be paid to general hygiene. The bowels must move or be made to move. After the first 48 hours the patient should be instructed how to exercise. Walking is the best form. Details regarding exercise will be given in a later chapter, page 104.

After two or three days the diet may be increased to the following schedule:

Diet No. 3

900 grams (30 oz.) of 5 per cent. green vegetables
4 eggs
540–720 (3–4 cups, 6 oz. each) of broth
180 grams (6 oz.) white meat of chicken
3 grams (1/10 oz.) Loeb's Luft bread (1 inch)
Alcohol, if necessary.

When the patient is under treatment and the diet reduced, the urine, though free from acetone and diacetic acid at the begining, may at times show marked reaction to both. Usually this condition will adjust itself as the diet is increased and rarely, if ever, is recourse to other means necessary to eliminate it. The urine is examined daily. In mild cases, I do not give bicarbonate of soda to neutralize the acidosis, as it may upset

the stomach, cause nausea, and sometimes prolong the condition (See page 85).

NAME Diet No. 3 DATE ..... DAY ..... DAYS TREATED ..... NO. .....

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
30	oz	5% vegetables	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
4		Eggs	0	24	24	312	2		0	12	12	156	1		0	6	6	78	1		0	6	6	78
3	c/p	Black coffee	0	0	0	0	1	c/p	0	0	0	0	1	c/p	0	0	0	0	1	c/p	0	0	0	0
3	"	Broth	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0
1	¼	Luft bread	1	1	0	10	1	¼	1	1	0	10	0		0	0	0	0	0		0	0	0	0
6	oz	Chicken	0	48	30	402							6	oz	0	48	30	402						
6	oz	Fish	0	36	0	144													6	oz	0	36	0	144
TOTAL GRAMS			31	124	54	1108			11	18	12	226			10	59	36	600			10	47	6	282
MULTIPLY FOR CALORIES			4	4	9				4	4	9				4	4	9				4	4	9	
TOTAL CALORIES			124	496	486	1108			44	74	108	226			40	236	324	600			40	188	54	282

FIG. 5.—DIET No. 3.

If for another 48 hours a sugar and acetone-free specimen is obtained, the diet is replaced by the following. (If acidosis exists add 2 level tablespoonfuls of oatmeal, which has been cooked for 2 hours, without cream.)

DIET No. 4A

900 grams (30 oz.) of 5 per cent. green vegetables.

540 c.c. (3 cups, 6 oz. each) of coffee with a teaspoonful of cream in each cup

240 grams (8 oz.) of chicken or lamb chop

240 grams (8 oz.) fish

2–4 eggs, hard-boiled, soft-boiled or poached

6 grams (⅕ oz.) gluten Luft bread[1] (about 2 inches)

NAME Diet No 4A ____ DATE ____ DAY ____ DAYS TREATED ____ NO. ____

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
30	oz	5% VEGETABLES	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
4		EGGS	0	24	24	312	2		0	12	12	156	1		0	6	6	78	1		0	6	6	78
3	Cup	COFFEE	0	0	0	0	1	Cup	0	0	0	0	1	Cup	0	0	0	0	1	Cup	0	0	0	0
3		BROTH	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0
2	Slice	LUFT BREAD	2	3	0	26	1	Slice	1	1	0	10	0		0	0	0	0	1	Slice	1	1	0	10
8	oz	CHICKEN (Lng Cmp)	0	64	40	616	0		0	0	0	0	8	oz	0	64	40	616	0		0	0	0	0
8	oz	FISH	0	40	0	192	0		0	0	0	0	0		0	0	0	0	8	oz	0	40	0	192
½		CREAM (in coffee)	½	3	3	31	⅙	oz	⅙	⅙	1	10	⅙	oz	⅙	⅙	1	10	⅙	oz	⅙	⅙	1	11
		--	-	-	-	-																		
1	T	DIET 4B OATMEAL (NO CREAM)	8	2	½	47½																		
		TOTAL GRAMS	52½	154½	67	1351			11½	19½	13	236			10½	75½	47	764			11½	60½	7	351
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	230	616	603	1351			46	76	117	236			40½	300½	423	764			46	240½	63	351

FIG. 6.—DIET NO. 4A.

[1] Luft Bread is baked by Loeb's Diabetic Food Bakery, New York, and is used because it is found to be of constant starch content. Each loaf weighs 30 grams or 1 oz., and each inch contains about 0.83 grams of starch and 1.66 grams of protein. An analysis of this bread by the Connecticut Agricultural Experimental Station on December 13, 1919, showed:

Water	9.17%
Ash	1.78%
Protein (N × 6.25)	50.25%
Nitrogen-free extract	27.34%
Fiber	0.18%
Fat (ether extract)	11.08%
Starch	26.78%
Weight supplying same amount of carbohydrates as 10 grams of white bread	26.78 grams

If the patient is without acidosis and continues to do well, the diet is increased every 24 hours as per the following lists:

Diet No. 5A

900 grams (30 oz.) of 5 per cent. green vegetables
540 c.c. (3 cups, 6 oz. each) of coffee and cream
540–720 c.c. (3–4 cups, 6 oz. each) of broth
240 grams (8 oz.) fish
240 grams (8 oz.) chicken, steak ar chop
2–4 eggs
30 grams (1 oz.) bacon
9 grams (3 inches) Luft bread
30 grams (1 oz.) cream cheese

Name Diet No. 5A						Date						Day						Days Treated						No.					
Total Weight		Food	Diet in Grams Car	Pro	Fat	Cals	Breakfast Weight		Car	Pro	Fat	Cals	Lunch Weight		Car	Pro	Fat	Cals	Supper Weight		Car	Pro	Fat	Cals
30	oz	5% Vegetables	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
2		Eggs	0	12	12	156	2		0	12	12	156	0		0	0	0	0	0		0	0	0	0
3	c/3	Coffee with cream	2	2	3	31	1	c/3	1/3	1/6	1	10	1	c/3	1/3	1/6	1.	10	1	c/3	1/3	1/6	1	10
3	-	Broth	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0
3	3/9	Luft Bread	3	4	0	30	1	3/9	1	1	0	10	1	3/9	1	1	0	10	1	3/9	1.	1	0	10
8	oz	Meat	0	64	40	616	0		0	0	0	0	8	oz	0	64	40	616	8		0	0	0	0
8	oz	Fish	0	48	0	192	0		0	0	0	0	0		0	0	0	0	8	oz	0	48	0	192
1	oz	Bacon	0	5	15	155	1	oz	0	5	15	155	0		0	0	0	0	0		0	0	0	0
1	oz	Phil Cream Cheese	1	8	10	126	1/8	oz	1/8	2 1/8	3 1/8	42	1/8	oz	1/8	2 1/8	3 1/8	42	1/8	oz	1/8	2 1/8	3 1/8	42
-	-	- - - - - - -	-	-	-	-	-																	
		Diet 5B																						
1/2		Grape Fruit	10	0	0	40																		
		Instead of bacon Cream cheese																						
Total Grams			34	157	50	1400			11	28 1/2	31 1/2	433			11	73 1/2	41 1/2	738			11	51 1/2	41 1/2	314
Multiply for Calories			4	4	9				4	4	9				4	4	9				4	4	9	
Total Calories			136	628	720	1400			46	114 1/2	282	433			46	293 1/2	369	738			46	206 1/2	369	314

Fig. 7.—Diet No. 5A.

If acidosis is present, omit bacon, cheese and cream and allow instead ½ grape fruit. (DIET No. 5B)

If it is found that these diets can be tolerated, patients without acidosis may add grape fruit, lean ham, bacon, butter, olives and Luft bread to their diet as follows:

DIET No. 6A

½ grape fruit

900 grams (30 oz.) of 5 per cent. green vegetables

540–720 c.c. (3–4 cups, 6 oz. each) of coffee, with a teaspoonful of cream in each

540–720 c.c. (3–4 cups, 6 oz. each) of broth

240 grams (8 oz.) of fish, boiled, broiled or baked

240 grams (8 oz.) of chicken, chop or steak

2–4 eggs

60 grams (2 oz.) bacon

12–18 grams (4–6 inches) Luft bread

45 grams (1½ oz.) of Philadelphia cream cheese or Swiss cheese

From this point on, a slice or two of Lister Bread may be substituted, at each meal for

the Luft bread. This bread is made of Lister's casein flour according to the directions given on page 111.

NAME *Diet No 6A* DATE DAY DAYS TREATED NO.

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
½		Grape Fruit	10	0	0	40	½		10	0	0	40	0		0	0	0	0	0		0	0	0	0
30	oz	5% Vegetables	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
3	tsp	Coffee with cream	1	1	3	31	1	tsp	⅓	⅓	1	10	1	tsp	⅓	⅓	1	10	1	tsp	⅓	⅓	1	10
2	oz	Bacon	0	10	30	310	2	oz	0	10	30	310	0		0	0	0	0	0		0	0	0	0
3	tsp	Broth	0	0	0	0	1	tsp	0	0	0	0	1	tsp	0	0	0	0	1	tsp	0	0	0	0
2		Eggs	0	12	12	156	2		0	12	12	156	0		0	0	0	0	0		0	0	0	0
8	oz	Meat	0	64	40	616	0		0	0	0	0	0	oz	0	64	40	616	0		0	0	0	0
8	oz	Fish	0	40	0	180	0		0	0	0	0	0		0	0	0	0	8	oz	0	40	0	192
1½	oz	Phil. Cream Cheese	1.5	12	15	189	½	oz	1	4	5	63	½	oz	1	4	5	63	½	oz	1	4	5	63
6		Luft Bread	6	9	0	60	2		2	3	0	20	2		2	3	0	20	2		2	3	0	20
		Diet 6B																						
2	T	Oatmeal	8	2	4	47																		
		TOTAL GRAMS	48	170	100	1774			22½	54½	48	653			12½	70½	46	769			12½	60½	6	345
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	192	680	900	1774			90½	216½	432	653			50½	280½	414	769			50½	240½	54	345

FIG. 8.—DIET NO. 6A.

Patients who have tolerated Diet No. 5 B after a three-day trial and in whom acetone and diacetic acid have been eliminated may now have Diet No. 6 B.

DIET NO. 6B

½ grape fruit

2 level teaspoonfuls of oatmeal (cooked for two hours) without cream and the foregoing diet without the bacon, cream or cheese.

For all cases, whether free from acetone or not,

I now institute what for want of a better name is called a "Green Day." The milder the case, the more the diet is modified to meet the condition. In mild cases like those already described, the patient may at first be allowed on his weekly "Green Day:"

DIET No. 7

900 grams (30 oz.) of 5 per cent. green vegetables

540 c.c. (3 cups, 6 oz. each) of black coffee

540–720 c.c. (3–4 cups, 6 oz. each) of chicken broth

3 hard-boiled eggs

1 quart of Kalak water, or a quart of lemonade made from the juice of 1 lemon added to a quart of water.

The "Green Day" should fall on the same day each week. Although this arrangement is disagreeable to most patients we can, by this means bring the tolerance up to a much higher point thereby compensating for any annoyance the "Green Day" entails.

It is necessary to examine the blood from time to time for the sugar content, as the diet must

be determined by the quantity of the blood sugar. The longer a normal blood sugar is maintained in a patient, the sooner can his diet be increased to within almost normal limits. (Un-

NAME Diet No 7 DATE GREEN DAY DIET DAYS TREATED NO.

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
30	oz	5% VEGETABLES	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
3		EGGS	0	18	18	234	1		0	6	6	78	1		0	6	6	78	1		0	6	6	78
3	oz	BLACK COFFEE	0	0	0	0	1	oz	0	0	0	0	1	oz	0	0	0	0	1	oz	0	0	0	0
8	"	BROTH	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0
TOTAL GRAMS			30	33	18	414			10	11	6	138			10	11	6	138			10	11	6	138
MULTIPLY FOR CALORIES			4	4	9				4	4	9				4	4	9				4	4	9	
TOTAL CALORIES			120	132	162	414			40	44	54	138			40	44	54	138			40	44	54	138

FIG. 9.—DIET NO. 7.

fortunately time is an uncertain factor in all diabetes cases and the physician's judgment must be the sole guide for each specific case.) The average blood sugar is about 0.12 per cent. or 120 mgs. per 100 c.c. of blood and ranges from between 0.065 per cent. and 0.14 per cent.

A high threshold in a diabetic patient such as 0.17 per cent. blood sugar, with an absence of glycosuria shows an impermeability of the kid-

neys or an arteriosclerosis, a condition which will be taken up later in Chapter IV.

The diet may in this way be increased provided the tested specimens are found to be sugar free. The following diet furnishes a further increase in food intake:

Diet No. 8

½ grape fruit, or about 10–15 strawberries or raspberries

900 grams (30 oz.) 5 per cent. green vegetables or 600 grams (20 oz.) 5 per cent. and

150 grams (5 oz.) of the 10 per cent. green vegetables.

NAME Diet No 8 DATE ____ DAY ____ DAYS TREATED ____ No. ____

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS.	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
½		Grape Fruit	10	0	0	40	½		10	0	0	40	0		0	0	0	0	0		0	0	0	0
30	oz	5% Vegetables	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
2	oz	Bacon	0	10	30	310	2	oz	0	10	30	310	0		0	0	0	0	0		0	0	0	0
3	c/3	Coffee with Cream	1	1	3	51	1	c/3	1/6	1/6	1	10	1	c/3	1/6	1/6	1	10	1	c/3	1/6	1/6	1	10
2		Eggs	0	12	12	156	2		0	12	12	156	0		0	0	0	0	0		0	0	0	0
3	c/3	Broth	0	0	0	0	1	c/3	0	0	0	0	1	c/3	0	0	0	0	1	c/3	0	0	0	0
8	oz	Meat	0	64	40	616	0		0	0	0	0	8	oz	0	64	40	616	0		0	0	0	0
8	oz	Fish	0	48	0	192	0		0	0	0	0	0		0	0	0	0	8	oz	0	48	0	192
1	oz	Butter	0	0	25	225	½	oz	0	0	8	72	½	oz	0	0	8	72	½	oz	0	0	8	72
2	oz	Phil. Cream Cheese	2	16	20	252	0		0	0	0	0	1	oz	1	8	10	126	1	oz	1	8	10	126
9		Luft Bread	10	15	0	100	3		3⅓	5	0	32	3		3⅓	5	0	32	3		3⅓	5	0	32
		TOTAL GRAMS	58	180	130	2082			23	32	51	680			14	82	59	910			14	66	19	492
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	210	722	1170	2102			94	128	459	680			56	328	531	917			60	264	171	493

Fig. 10.—Diet No. 8.

540 c.c. (3 cups, 6 oz. each) of coffee, with a teaspoonful of cream to each cup

540–720 c.c. (3–4 cups, 6 oz. each) of chicken broth (this is optional)

240 grams (8 oz.) of chicken, steak, chops or roast beef

240 grams (8 oz.) of fish, boiled or broiled

2–4 eggs in any form

30 grams (1 oz.) or 1 loaf of Luft bread or 6 slices of Lister bread

60 grams (2 oz.) of bacon

30 grams (1 oz.) sweet butter

60–75 grams (2–2½ oz.) Philadelphia cream cheese

This diet is prescribed especially for acetone-free cases. It should be remembered, however, that when treatment has progressed to this point, cases which have had acetone and diacetic acid present in the urine are usually found to be free from these and the same diet, therefore, can be given to patients who were originally classified as showing acetone in the urine, as to those who were free from acetone at first. Oatmeal (2–3 level tablespoonfuls) can be given

to both classes of patients. Some of the 10 per cent. vegetables, as kohl rabi, onions, squash, mushrooms, etc., may also be added. These have an available carbohydrate content of 6 per cent. (See Table I). It is usual to start with 6 ounces (or 180 grams) of these vegetables and gradually increase this amount to about 10 ounces (or 300 grams). This quantity is to be figured with the 900 grams of green vegetables permitted in Diets Nos. 7 and 8.

As the diet is increased, the quantity becomes too great for the average patient to digest. The amount prescribed must, therefore, be adjusted to the individual needs. Instead of 900 grams of greens, which makes about 300 grams to each meal, the allotment of green vegetables for breakfast is omitted. Most patients will be satisfied with a breakfast consisting of 2 eggs, 60 grams (2 oz.) of bacon, a cup of coffee (180 c.c.) with cream, some cheese and butter, and one of the following:

3 inches of Luft bread

2 slices of Lister's bread

1 to 2 muffins made of Lister's flour

1 to 2 muffins or biscuits made of Soya bean flour

The broth may be discontinued since it has practically no food value (about 3 calories to the ounce or 30 c.c.). It is used at first merely as a "filler" and afterward is employed as such on the "Green Days." Patients often attempt to eat all the food allotted to them, no matter how voluminous the diet becomes, a practice which results in marked indigestion. It must be understood that the diet as here given indicates what is allowed; not everything on the list is mandatory.

In this way the diet is increased slowly and gradually. Fruit is given as indicated, and, if no sugar appears on examination, oranges, peaches, berries and nuts are added. It is also advisable at this time to change the bread diet. Two kinds of muffins have already been mentioned in the diets above; cookies, cheese pancakes, and as dessert, spice cakes and crullers, as set forth in the chapter on menus, may also be included.

In some of the mild cases another step may be taken at this point by replacing the Loeb gluten bread or the Lister bread with an ordinary rye or white bread. In the majority of cases, however,

this should not be done. The change can be accomplished in the following way: After the patient has had ordinary gluten or Lister bread for at least two weeks, one slice of white, or, preferably rye bread, 3 by 3 by ½ inches (weighing approximately 30 grams) is substituted for the gluten or Lister bread at one meal.

If, after a few days, sugar does not appear in the urine and the blood sugar remains within normal limits, the bread of another meal is replaced by a slice of rye bread. This substitution is carried on until the gluten bread is entirely replaced.[1] It must be emphasized, however, that this can be done only in a small percentage of cases. Case No. 350, although belonging to the severe type, shows this, as well as the treatment and the return to almost normal diet.

Case No. 350. Mrs. E. L. Age 51. American. Family history is negative regarding diabetes and Bright's disease. The patient had not had a

[1] The advantage or necessity for returning to ordinary breads as quickly as possible is one of utility entirely. Gluten breads are disliked by most patients and (especially in the case of patients who are not living at their own homes) cannot be obtained at all times and places without considerable inconvenience.

serious illness up to eight years ago when sugar was discovered in the urine. Since that time treatment has been followed indifferently. One year ago the patient had an abscess of the left lung, which ruptured into a bronchus. On May 2, 1919, the writer was called in to see her by her physician. At that time she reported that she had had some teeth extracted about three weeks previously. Since that date she reported having had severe pains in the mouth and throat; temperature ranged between 103° and 104° F.; pulse, 120; blood pressure, 120. The patient was very restless. Locally the gums of the right lower jaw looked edematous. This area and the throat were covered with a greenish membrane and were quite sore. The glands at the angles of the jaw were much enlarged. The urine examination showed 5.4 per cent sugar; 4 plus acetone, and diacetic acid. The patient was placed on the following diet:

720 gms. (24 oz.) 5 per cent green vegetables
540 c.c. (3 cups, 6 oz. each) black coffee
3 hard boiled eggs (20 minutes)
540–720 c.c. (3 to 4 cups, 6 oz. each) chicken broth
1 quart bottle Kalak water
16 c.c. Bacillus Bulgaricus, t.i.d., ½ hour a.c.

The chart shows this diet properly proportioned for the three meals.

NAME Case # 350 DATE DAY DAYS TREATED NO. 2

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
24	oz	5% VEGETABLES	24	12	0	144	8	oz	8	4	0	48	8	oz	8	4	0	48	8	oz	8	4	0	48
3		EGGS	0	18	18	254	1		0	6	6	78	1		0	6	6	78	1		0	6	6	78
3	c/2	BLACK COFFEE	0	0	0	0	1	c/2	0	0	0	0	1	c/2	0	0	0	0	1	c/2	0	0	0	0
3	-	CHICKEN BROTH	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0
1	c/2	KALAK WATER	0	0	0	0																		
		TOTAL GRAMS	24	30	18	378			8	10	6	126			8	10	6	126			8	10	6	126
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	96	120	162	378			32	40	54	126			32	40	54	126			32	40	54	126

FIG. 11.—DIET PRESCRIBED ON MAY 2.

The patient was not seen again until May 16, 1919, although the diet was increased under the direction of the physician in charge who was in constant touch with the writer during the interim. At this examination the patient weighed 145 pounds; the blood pressure was 120. The diet had been increased to

900 gms. (30 oz.) 5 per cent. green vegetables
540 c.c. (3 cups, 6 oz. each) black coffee
540–720 c.c. (3 to 4 cups, 6 oz. each) chicken broth
120 gms. white meat of chicken
3 hard boiled eggs
1 quart bottle Kalak water

NAME _____ DATE _____ DAY _____ DAYS TREATED _____ NO. 2

TOTAL WEIGHT	FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT	CAR	PRO	FAT	CALS	LUNCH WEIGHT	CAR	PRO	FAT	CALS	SUPPER WEIGHT	CAR	PRO	FAT	CALS
30 oz	5% VEGETABLES	30	15	0	160	10 oz	10	5	0	60	10 oz	10	5	0	60	10 oz	10	5	0	60
3	EGGS	0	18	18	234	1	0	6	6	78	1	0	6	6	78	1	0	6	6	78
3 cups	BLACK COFFEE	0	0	0	0	1 cup	0	0	0	0	1 cup	0	0	0	0	1 cup	0	0	0	0
3	CHICKEN BROTH	0	0	0	0	1 -	0	0	0	0	1 -	0	0	0	0	1 -	0	0	0	0
4 oz	CHICKEN (BREAST)	0	32	20	308						4 oz	0	32	20	308					
	TOTAL GRAMS	30	65	38	722		10	11	6	138		10	43	26	446		10	11	6	138
	MULTIPLY FOR CALORIES	4	4	9			4	4	9			4	4	9			4	4	9	
	TOTAL CALORIES	120	260	342	722		40	44	54	138		40	172	234	446		40	44	54	138

FIG. 12.—DIET PRESCRIBED A FEW DAYS LATER.

The patient looked very well; her pulse and temperature were normal; the condition of the throat appeared greatly improved. The gums had healed and the patient was advised to order the dental plate needed. The urine examination showed no sugar present; 3 plus acetone; no diacetic acid. The patient's diet was increased to the following:

900 gms. (30 oz.) 5 per cent. green vegetalbes
540 c.c. (3 cups, 6 oz.each) black coffee
540 c.c. (3 cups, 6 oz. each) chicken broth
180 gms. (6 oz.) white meat of chicken
60 gms. (2 oz.) plain boiled fish
4 eggs hard-boiled
1 quart bottle Kalak water

On May 18 the patient's condition was not

NAME			DATE				DAY					DAYS TREATED						NO. 3				
TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
30	oz	5% VEGETABLES	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
4		EGGS	0	24	24	312	2		0	12	12	156	0		0	0	0	0	2		0	12	12	156
3	cups	BLACK COFFEE	0	0	0	0	1	cup	0	0	0	0	1	cup	0	0	0	0	1	cup	0	0	0	0
3	"	BROTH	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0
6	oz	CHICKEN/BREAST	0	48	30	462							6	oz	0	48	30	462	0		0	0	0	0
2	oz	FISH	0	12	0	48													2	oz	0	12	0	48
TOTAL GRAMS			30	99	54	1002			10	17	12	216			10	53	30	522			10	29	12	264
MULTIPLY FOR CALORIES			4	4	9				4	4	9				4	4	9				4	4	9	
TOTAL CALORIES			120	396	486	1002			40	68	108	216			40	212	270	522			40	116	108	264

FIG. 13.—DIET PRESCRIBED ON MAY 16.

so encouraging. She had a severe headache, her eyes pained her and were heavy. The bowels were constipated. The temperature and pulse were normal. Urine examination showed a trace of sugar, 2 plus acetone, but no diacetic acid. Blood examination showed a sugar content of 0.18 per cent. The same diet was continued.

Two days later, on May 20, the patient was somewhat improved; she felt stronger and more cheerful. The urine examination still showed a trace of sugar and 2 plus acetone. The temperature and pulse, however, were normal. The patient was placed on the following "Green

Day" diet for 24 hours, after which she resumed the diet prescribed on May 16.

900 gms. (30 oz.) 5 per cent. vegetables
540 c.c. (3 cups, 6 oz. each) black coffee
540 c.c. (3 cups, 6 oz. each) chicken broth
3 hard-boiled eggs

NAME _____ DATE "GREEN DAY" _____ DAYS TREATED _____ NO. 4

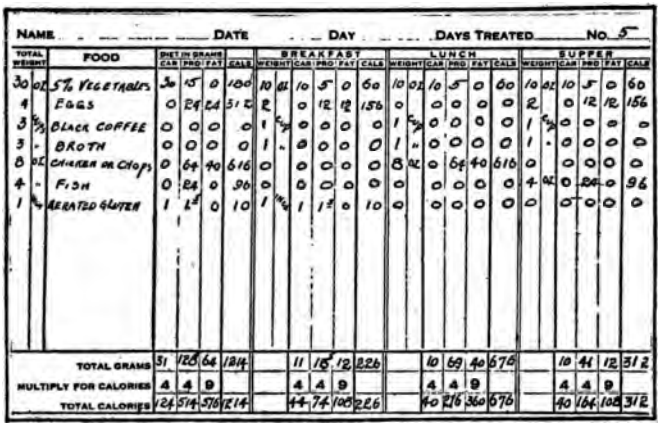
TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
30	oz	5% VEGETABLES	30	15	0	180	lb	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
3		EGGS	0	18	18	234	1		0	6	6	78	1		0	6	6	78	1		0	6	6	78
3	c	BLACK COFFEE	0	0	0	0	1	c	0	0	0	0	1	c	0	0	0	0	1	c	0	0	0	0
3	-	BROTH	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0
		TOTAL GRAMS	30	33	18	414			10	11	6	138			10	11	6	138			10	11	6	138
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	120	132	162	414			40	44	54	138			40	44	54	138			40	44	54	138

FIG. 14.—"GREEN DAY" DIET.

The "Green Day" weakened the patient slightly, but the blood pressure remained at 120 and the temperature and pulse were normal. The blood sugar content came down to 0.10 per cent. On May 22, the diet was changed to the following:

900 gms. (30 oz.) 5 per cent. green vegetables
540 c.c. (3 cups, 6 oz. each) black coffee

540–720 c.c. (3 to 4 cups, 6 oz. each) chicken broth
240 gms. (8 oz.) chicken or lamb chops
120 gms. (4 oz.) fish
3 gms. (1 inch) aerated gluten bread
4 hard-boiled eggs (20 minutes)
1 quart bottle Kalak water



NAME _____ DATE _____ DAY _____ DAYS TREATED _____ NO. 5

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
30	oz.	5% Vegetables	30	15	0	100	10	oz.	10	5	0	60	10	oz.	10	5	0	60	10	oz.	10	5	0	60
4		Eggs	0	24	24	312	2		0	12	12	156	0		0	0	0	0	2		0	12	12	156
3	cups	Black coffee	0	0	0	0	1	cup	0	0	0	0	1	cup	0	0	0	0	1	cup	0	0	0	0
3	"	Broth	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0
8	oz.	Chicken or Chops	0	64	40	616	0		0	0	0	0	8	oz.	0	64	40	616	0		0	0	0	0
4	"	Fish	0	24	0	96	0		0	0	0	0	0		0	0	0	0	4	oz.	0	24	0	96
1	"	Aerated Gluten	1	1	0	10	1	inch	1	1	0	10	0		0	0	0	0	0		0	0	0	0
		TOTAL GRAMS	31	128	64	1214			11	18	12	226			10	69	40	676			10	41	12	312
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	124	514	576	1214			44	74	108	226			40	276	360	676			40	164	108	312

FIG. 15.—DIET PRESCRIBED ON MAY 21.

The patient continued this diet until May 25. She still felt weak and her weight was now only 143 pounds. Blood pressure remained at 120; the urine showed no sugar, and the acetone reaction indicated only a trace. The diet was changed to the following:

900 gms. (30 oz.) 5 per cent. green vegetables
540 c.c. (3 cups, 6 oz. each) black coffee
540–720 c.c. (3 to 4 cups, 6 oz.) chicken broth

240 gms. (8 oz.) white meat of chicken
180 gms. (6 oz.) fish
3 eggs
9 gms. (3 inches) aerated (Luft) gluten bread
1 quart bottle Kalak water

NAME _____ DATE _____ DAY _____ DAYS TREATED _____ NO. 6

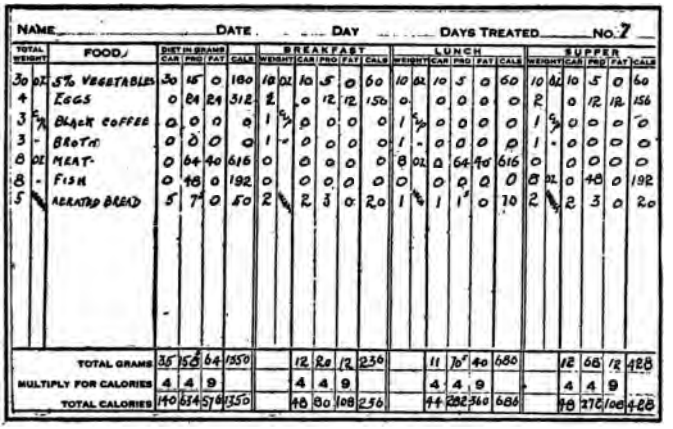
TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
30	oz	5% Vegetables	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
3		Eggs	0	18	18	234	2		0	12	12	156	0		0	0	0	0	1		0	6	6	78
3	cups	Black Coffee	0	0	0	0	1	cup	0	0	0	0	1	cup	0	0	0	0	1	cup	0	0	0	0
3	"	Broth	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0
8	oz	Chicken	0	64	40	616	0		0	0	0	0	8	oz	0	64	40	616	0		0	0	0	0
6	oz	Fish	0	36	0	144	0		0	0	0	0	0		0	0	0	0	6	oz	0	36	0	144
3	slices	Aerated Bread	3	4	0	30	1	slice	1	1	0	10	1	slice	1	1	0	10	1	slice	1	1	0	10
		TOTAL GRAMS	33	137	58	1204			11	18	12				11	76	40	686			11	48	6	292
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	132	550	522	1204			44	74	108				44	282	360	686			44	194	54	292

FIG. 16.—DIET PRESCRIBED ON MAY 22.

On May 27, the patient reported that she felt fairly well, but still somewhat weak. On examination the urine showed no sugar, but a trace of acetone. The blood pressure remained at 120. The diet was further increased as follows:

900 gms. (30 oz.) 5 per cent. green vegetables
540 c.c. (3 cups, 6 oz. each) black coffee
540–720 c.c. (3 to 4 cups, 6 oz. each) chicken broth
4 eggs hard-boiled (20 minutes)
240 gms. (8 oz.) chicken, lamb chops or steak

240 gms. (8 oz.) fish
15 gms. (5 inches) aerated (Luft) bread
1 quart bottle Kalak water



NAME _____ DATE _____ DAY _____ DAYS TREATED _____ No. 7

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
30	oz	5% VEGETABLES	30	15	0	180	18	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
4		EGGS	0	24	24	312	2		0	12	12	156	0		0	0	0	0	2		0	12	12	156
3	c/n	BLACK COFFEE	0	0	0	0	1	c/n	0	0	0	0	1	c/n	0	0	0	0	1	c/n	0	0	0	0
3	-	BROTH	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0	1	-	0	0	0	0
8	oz	MEAT	0	64	40	616	0		0	0	0	0	8	oz	0	64	40	616	0		0	0	0	0
8	-	FISH	0	48	0	192	0		0	0	0	0	0		0	0	0	0	8	oz	0	48	0	192
5		AERATED BREAD	5	7	0	50	2		2	3	0	20	1		1	1	0	10	2		2	3	0	20
		TOTAL GRAMS	35	158	64	1350			12	20	12	236			11	70	40	680			12	68	12	428
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	140	632	576	1350			48	80	108	236			44	282	360	680			48	272	108	428

FIG. 17.—DIET PRESCRIBED ON MAY 27.

On the following day the patient was given a "Green Day" diet, and on one day each week, thereafter, this diet was prescribed. In each case, however, 4 eggs were given instead of the 3 as outlined in the diet of May 20. Two days later (May 30) when the patient reported for further observation and treatment, she complained of being depressed and tired. The urine examination showed no sugar, and the acetone content was much less, only a faint trace being present. The blood pressure was 118; the weight

144 pounds. The diet was again increased as follows:

¼ grape fruit
900 gms. (30 oz.) 5 per cent. vegetables
540 c.c. (3 cups, 6 oz. each) black coffee
540–720 c.c. (3 to 4 cups, 6 oz. each) chicken broth
4 hard-boiled eggs (20 minutes)
240 gms. (8 oz.) fish
240 gms. (8 oz.) chicken, lamb chop, steak or roast beef
21 gms. (7 inches) aerated (Gluten) bread

NAME ..... DATE ..... DAY ..... DAYS TREATED ..... NO. 8

TOTAL WEIGHT	FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT	CAR	PRO	FAT	CALS	LUNCH WEIGHT	CAR	PRO	FAT	CALS	SUPPER WEIGHT	CAR	PRO	FAT	CALS
¼	GRAPE FRUIT	5	0	0	20	¼	5	0	0	20	0	0	0	0	0	0	0	0	0	0
30 oz	5% VEGETABLES	30	15	0	180	10 oz	10	5	0	60	10 oz	10	5	0	60	10 oz	10	5	0	60
4	EGGS	0	24	24	312	2	0	12	12	156	0	0	0	0	0	2	0	12	12	156
3 cups	BLACK COFFEE	0	0	0	0	1 cup	0	0	0	0	1 cup	0	0	0	0	1 cup	0	0	0	0
3 "	BROTH	0	0	0	0	1 "	0	0	0	0	1 "	0	0	0	0	1 "	0	0	0	0
8 oz	MEAT	0	64	40	616	0	0	0	0	0	8 oz	0	64	40	616	0	0	0	0	0
8 "	FISH	0	48	0	192	0	0	0	0	0	0	0	0	0	0	8 oz	0	48	0	192
7 slices	AERATED BREAD	7	10	0	70	3 slices	3	4	0	30	2 slices	2	3	0	20	2 slices	2	3	0	20
	THE 2 EGGS THAT APPEAR IN MENU TAKEN 1 AT 3 PM AND 1 AT 10 PM										MEAL WERE OFTEN									
	TOTAL GRAMS	42	161	64	1390		18	21	12	266		12	72	40	696		12	68	12	428
	MULTIPLY FOR CALORIES	4	4	9			4	4	9			4	4	9			4	4	9	
	TOTAL CALORIES	168	646	576	1390		72	84	108	266		48	288	360	696		48	272	108	428

FIG. 18.—DIET PRESCRIBED ON MAY 30.

This diet was continued until June 3. When the patient was interviewed on this day, she felt greatly improved and was not tired or depressed. Blood pressure, 115; weight 142½ pounds, slightly less than on May 30. The urine

examination showed an absence of sugar; the acetone reaction was doubtful. The diet was increased by ¼ grape fruit, otherwise the quantities allowed were the same as those noted above. Examination on June 6 showed the patient slightly weaker as the result of a "Green Day" on June 4. The reduced diet of the "Green Day" seemed to disturb the patient greatly. The patient had also been having considerable annoyance in having the dental plate properly fitted. The pressure of the plate on the gums caused certain ulcerated areas; as a result, the patient could not employ the plate in mastication. The urine examination showed a reappearance of the acetone; the sugar was still absent. The blood pressure on this day was 120; weight 142 pounds. The following diet was prescribed:

½ grape fruit
900 gms. (30 oz.) 5 per cent. green vegetables
540 c.c. (3 cups, 6 oz. each) coffee with 4 c.c. cream to each cup
540–720 c.c. (3 to 4 cups, 6 oz. each) chicken broth
4 eggs (hard-boiled)
240 gms. (8 oz.) chicken, lamb chop, steak or roast beef
240 gms. (8 oz.) fish
15 gms. Philadelphia cream cheese
21 gms. (7 inches) aerated Gluten bread

NAME ..... DATE ..... DAY ..... DAYS TREATED ..... NO. 9

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
½		GRAPE FRUIT	10	0	0	40	½		10	0	0	40	0		0	0	0	0	0		0	0	0	0
30	oz	5% VEGETABLES	20	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
4		EGGS	0	24	24	312	2		0	12	12	156	0		0	0	0	0	2		0	12	12	156
3	c	COFFEE WITH CREAM	4	4	3	51	1	c	½	½	1	10½	1	c	½	½	1	10½	1	c	½	½	1	10½
3	"	BROTH	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0
8	oz	MEAT	0	64	40	616	0		0	0	0	0	8	oz	0	64	40	616	0		0	0	0	0
8	oz	FISH	0	48	0	192	0		0	0	0	0	0		0	0	0	0	8	oz	0	48	0	192
½	oz	PHIL. CREAM CHEESE	4	4	5	65	½	oz	4	4	5	65	0		0	0	0	0	0		0	0	0	0
7		AERATED BREAD	7	10	0	70	3		3	4	0	30	2		2	3	0	20	2		2	3	0	20
		TOTAL GRAMS	48	166	72	1500			23	25	18	359			12½	72	41	706½			12½	68	13	438½
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	192	664	648	1500			94	102	162	358			49½	288	369	706½			49½	272	117	438½

FIG. 19.—DIET PRESCRIBED ON JUNE 6.

Four days later, June 10, the patient felt very well; she had improved greatly in appearance, also, having lost the waxy color of the complexion; the eyes also were clearer. The urine examination showed neither sugar nor acetone. Blood pressure was 125. The portion of aerated Gluten bread permitted was increased to 30 grams (9 to 10 inches) (100 calories), and the allowance of cream cheese to 30 grams (1 oz.) (126 calories). Veal (240 gms. or 8 oz.) was substituted for the other forms of meat permitted in the diet of June 6, and 60 grams (2 oz.) of smoked tongue was also added.

On June 13 the patient reported disturbance

after the "Green Day" on June 12; the patient seemed tired and weak. Urine examination showed absence of sugar; 2 plus acetone was present. The following diet was prescribed:

½ grape fruit
900 gms. (30 oz.) 5 per cent. green vegetables
540 c.c. (3 cups, 6 oz. each) coffee with 4 c.c. cream to each cup
540–720 c.c. (3 to 4 cups, 6 oz. each), chicken broth
4 eggs (hard-boiled)
2 level tablespoonfuls (60 gms. by weight) of well cooked oatmeal
240 gms. (8 oz.) chicken, chop, steak, roast beef or veal
240 gms. (8 oz.) fish
30 gms. (9 to 10 inches) aerated Gluten bread
45 gms. (1½ oz.) Philadelphia cream cheese
60 gms. (2 oz.) smoked tongue

NAME _____ DATE _____ DAY _____ DAYS TREATED _____ NO. 10

TOTAL WEIGHT		FOOD	DIET IN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT		CAR	PRO	FAT	CALS	LUNCH WEIGHT		CAR	PRO	FAT	CALS	SUPPER WEIGHT		CAR	PRO	FAT	CALS
½		GRAPE FRUIT	10	0	0	40	½		10	0	0	40	0		0	0	0	0	0		0	0	0	0
30	oz	5% VEGETABLES	30	15	0	180	10	oz	10	5	0	60	10	oz	10	5	0	60	10	oz	10	5	0	60
4		EGGS	0	24	24	312	2		0	12	12	156	0		0	0	0	0	2		0	12	12	156
3	cups	COFFEE WITH CREAM	2	2	3	31	1	cup	1/6	1/6	1	10	1	cup	1/6	1/6	1	10	1	cup	1/6	1/6	1	11
3	"	BROTH	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0	1	"	0	0	0	0
2	T	WELL-COOKED OATMEAL	8	2	3	47	2	T	8	2	3	47	0		0	0	0	0	0		0	0	0	0
8	oz	MEAT	0	64	40	616	0		0	0	0	0	8	oz	0	64	40	616	0		0	0	0	0
8	"	FISH	0	48	0	192	0		0	0	0	0	0		0	0	0	0	8	oz	0	48	0	192
9	slices	AERATED BREAD	10	15	0	100	3	slices	3	4	0	30	3	slices	3	4	0	30	3	slices	3	4	0	40
1½	oz	PHIL. CREAM CHEESE	15	12	15	189	½	oz	1	4	5	63	½	oz	1	4	5	63	½	oz	1	4	5	63
2	oz	SMOKED TONGUE	0	12	5	98	0		0	0	0	0	0		0	0	0	0	2	"	0	12	5	98
		EGGS AND TONGUE THAT APPEAR ON NIGHT LIST WERE DISTRIBUTED BETWEEN AFTERNOON AND MEAL BEFORE RETIRING																						
		TOTAL GRAMS	60	192	85	1805			31	27	18	406			13	77	46	779			13	95	25	620
		MULTIPLY FOR CALORIES	4	4	9				4	4	9				4	4	9				4	4	9	
		TOTAL CALORIES	240	770	765	1805			124	110	162	406			54	310	414	779			54	380	225	620

FIG. 20.—DIET PRESCRIBED ON JUNE 13.

Three days later, June 16, the patient reported that she felt much better. She did not feel as tired as previously. The urine examination showed only a faint trace of acetone; no sugar was present. Blood pressure was 110. The patient had eaten the amount of oatmeal prescribed and had tolerated it. The oatmeal allowance was increased to 3 level tablespoonfuls (90 gms.) (71 calories). The increase in the amount of cheese in the diet had caused the acetone excretion to increase to 3 plus. The sugar, however, as noted above, was absent. Accordingly, the cheese and Kalak water were omitted from the diet prescribed on June 13, otherwise, the diet was as noted above.

On June 24 the patient reported feeling well. The urine examination showed no sugar and only a faint trace of acetone. The blood pressure was 110. To the diet prescribed on June 13, 60 grams of corn beef (2 oz.) were added at this time, a few green olives, tomatoes (these, however, to be included in the 900 grams of 5 per cent. green vegetables allowed) and ½ dill pickle. During the four days which followed (up to June 28) the patient felt less comfortable on account of further annoyance in adjusting

the plate to the gums. She had to make several trips from the country to the city to have the plate properly fitted thereby relieving the pressure on the ulcerated areas of the gums. These trips, in conjunction with the pain incident to the inflamed gums, were weakening and depressing to the patient. She lost four pounds during this period. The urine examination, however, showed no sugar present and only the faintest trace of acetone. The following articles were added to the diet:

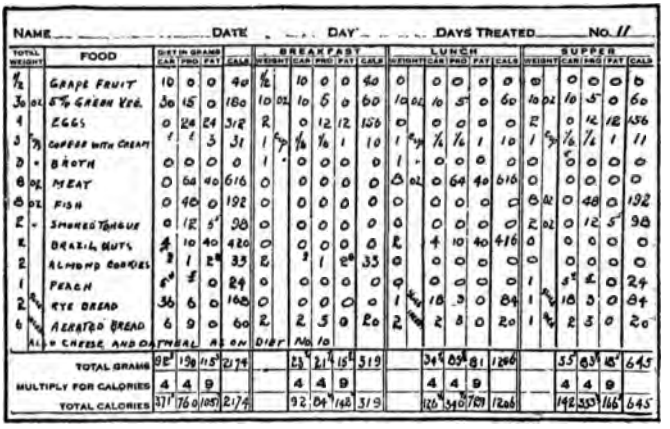
2 Brazil nuts
2 Almond cookies[1] (Formula appears in the chapter on menus and recipes) (33 calories)
1 small peach
6 stalks of asparagus

On July 1 the patient reported that the condition of the teeth and gums still caused her distress and pain. The plate did not yet fit properly hence it could not be used. The examination of the urine showed sugar absent and only a very faint trace of acetone present. The bread allowance was changed to 1 slice (20 gms.) (26 calories) of heavy gluten bread, and 6 inches (18 gms.) (60 calories) of aerated gluten bread.

[1] Almond cookies have: carbohydrate, 17 per cent.; protein, 21 per cent.; fats, 55 per cent. In 100 grams there are 660 calories. Each cooky weighs 2½ grams.

Olive oil (15 c.c.) with 4 c.c. of lemon juice was permitted as dressing for lettuce.

The patient was not seen again until July 17. During the interim (July 1 to July 17) nothing unusual developed in the case. She had con-



NAME _____ DATE _____ DAY _____ DAYS TREATED _____ NO. 11

TOTAL WEIGHT	FOOD	DIETIN GRAMS CAR	PRO	FAT	CALS	BREAKFAST WEIGHT	CAR	PRO	FAT	CALS	LUNCH WEIGHT	CAR	PRO	FAT	CALS	SUPPER WEIGHT	CAR	PRO	FAT	CALS
½	GRAPE FRUIT	10	0	0	40	½	10	0	0	40	0	0	0	0	0	0	0	0	0	0
30 oz	5% GREEN VEG.	30	15	0	180	10 oz	10	5	0	60	10 oz	10	5	0	60	10 oz	10	5	0	60
4	EGGS	0	24	24	312	2	0	12	12	156	0	0	0	0	0	2	0	12	12	156
3 ⅓	COFFEE WITH CREAM	1	1	3	31	1 ⅓	⅙	⅙	1	10	1 ⅓	⅙	⅙	1	10	1 ⅓	⅙	⅙	1	11
3	" BROTH	0	0	0	0	1 "	0	0	0	0	1 "	0	0	0	0	0	0	0	0	0
8 oz	MEAT	0	64	40	616	0	0	0	0	0	8 oz	0	64	40	616	0	0	0	0	0
8 oz	FISH	0	48	0	192	0	0	0	0	0	0	0	0	0	0	8 oz	0	48	0	192
2 "	SMOKED TONGUE	0	12	5	98	0	0	0	0	0	0	0	0	0	0	2 oz	0	12	5	98
2	BRAZIL NUTS	4	10	40	420	0	0	0	0	0	2	4	10	40	416	0	0	0	0	0
2	ALMOND COOKIES	2	1	2	33	2	2	1	2	33	0	0	0	0	0	0	0	0	0	0
1	PEACH	6	2	0	24	0	0	0	0	0	0	0	0	0	0	1	4	2	0	24
2 ⅔	RYE BREAD	36	6	0	168	0	0	0	0	0	1 ⅔	18	3	0	84	1 ⅔	18	3	0	84
6 ⅔	AERATED BREAD	6	9	0	60	2	2	3	0	20	2 ⅔	2	3	0	20	1 ⅔	2	3	0	20
2 oz	" CHEESE AND OATMEAL AS ON DIET No. 10																			
	TOTAL GRAMS	92	198	115	2174		23	21	15	319		34	89	81	1206		35	83	18	645
	MULTIPLY FOR CALORIES	4	4	9			4	4	9			4	4	9			4	4	9	
	TOTAL CALORIES	371	760	1035	2174		92	84	162	319		126	356	729	1206		142	333	166	645

FIG. 21.—TOTAL DIET PRESCRIBED ON JUNE 28.

tracted a slight cold which caused a recurrence of the acetone in the urine. The patient had become accustomed to using the dental plate; consequently, she was able to eat her food with less discomfort. The diet now prescribed was as follows:

½ grape fruit
900 gms. (30 oz.) 5 per cent. vegetables
540 c.c. (3 cups, 6 oz. each) coffee with 4 c.c. cream to each cup

540–720 c.c. (3 to 4 cups, 6 oz. each) chicken broth
2 to 4 eggs (hard-boiled)
240 gms. (8 oz.) chicken, chops, steak, roast beef or veal
240 gms. (8 oz.) fish
60 gms. smoked tongue
2 Brazil nuts
2 almond cookies
1 small peach
2 slices of rye bread (3 by 3 by ½ inches) (60 grams) and 6 inches aerated Gluten bread (18 grams)

One week later (July 24) the patient reported that she felt well, but feared the "Green Day" which was to follow since she always felt weak after the special diet. The blood pressure was 110. An extra slice of rye bread (3 slices in all) (84 calories) was now permitted—one for each meal. Butter, 30 grams (1 oz.) (225 calories) and the same amount of cream cheese (126 calories) were also permitted. This addition to the diet caused no disturbance. Four days later, examination showed the urine free from sugar and acetone. The blood pressure, however, was 105, due to the general exhausted condition of the patient as the result of the extremely warm weather then prevailing. The diet of cheese (89 calories) and butter (337 calories) was

increased to 45 grams (1½ ozs.); ¼ of a cantaloupe and an omelet were also added to the diet. On examination, three days later, the urine showed no change. Spice cakes and crullers (according to the recipes given in the chapter on menus and recipes) were added to the prescribed diet.

During the next week this diet was continued without change. The patient complained of intercostal neuralgia and pain in the right shoulder for which atophan was prescribed. The blood pressure was 110; the urine examination was negative. At this point the red meats were omitted from the diet, the white meat of chicken only being permitted. On August 7, the blood sugar was 0.11 per cent. The following articles were added to the diet:

½ (30 gms., 1 oz.) small baked potato (30 calories)
1 teaspoonful freshly grated unsweetened chocolate.[1]

During the following week the patient felt less comfortable on account of the pain in the shoulder and back. The dental plate again caused a slight ulceration of the gums as a result of pressure. Although the potato and chocolate had

[1] Maillard's unsweetened chocolate (chocolàt) was used in this instance.

been eaten, the urine examination showed absence of sugar and acetone. The blood pressure remained at 110. Five grains of duotonal and 1/30 of a grain of strychnia were given as a tonic. In addition to the foregoing diet, 60 grams (2 oz.) of ice cream (made of cream, eggs and glycerine) and a custard (made of cream and eggs) were permitted. The cultures of *Bacillus Bulgaricus*, which had been taken since the treatment was begun, were now eliminated.

On August 21 the patient was greatly disturbed and excited by an automobile collision between the motor in which she was riding and another machine. As a consequence she felt weak and depressed. The blood pressure, however, was 115; the urine examination showed sugar and acetone absent. The following articles were added to the diet:

60 gms. (2 oz.) mushrooms
30 gms. (1 oz.) mashed turnip
gelatine flavored with coffee, lemon or strawberries

On August 28, the patient reported that she felt greatly improved; she had completely recovered from the shock of the collision. The ulceration in the mouth, caused by the pressure

of the improperly fitted dental plate, was now healed. Although the patient had eaten potato and rye bread daily, examination showed the urine free from sugar and acetone. The blood pressure was now 115. One bottle, 180 grams (6. oz.) of fermillac was now added to the daily diet.

On September 12, the patient reported again for observation. The additions to the diet had been well tolerated. Aside from a slight annoyance from the dental plate the patient felt very comfortable. During the interim (August 28 to September 12) the diet had been varied; turkey, squab and lamb's tongue had been substituted for the other meats and had been well tolerated. The following articles were added to the diet at this time:

240 gms. (8 oz.) herring or mackerel
1 peach
60 gms. (2 oz.) Swiss, cottage or pot cheese mixed with 60 gms. (2 oz.) cream
1 small greening (apple)

With all these additions the diet had now become very liberal and varied so that the patient could take short trips away from home and still be able to obtain the proper food with-

out inconvenience. The urine continued to remain free from sugar and acetone. On October 28, the patient again reported for observation. Since the previous visit on September 12, she had eaten and tolerated salt mackerel, corned beef, one-fourth of a Cassaba melon, one-half of a small cantaloupe, 120 grams (4 oz.) smoked salmon, and pickled herring. Her "Green Day" diet was the same as the regular diet except that the bread, cereal and potato were omitted on these days. She had lost about 12 pounds since the treatment was begun now weighing 120 pounds, 12 ounces; however, the greater part of this loss in weight was the result of the suffering from ulceration of the gums caused by the defective dental plate. The blood pressure fluctuated between 110 and 120.

The complete diet allowance from which sufficient food could be selected was as follows:

Fruits
½ grape fruit (40 calories) or
½ orange or
1 peach or
¼ Cassaba melon or
½ cantaloupe or
dish of strawberries or raspberries

Vegetables

900 gms. from the following list: spinach, string beans, celery, lettuce, cauliflower, cabbage, water cress, kale, okra, cucumber, mushrooms, kohl rabi, turnips, potato, asparagus (180 calories)

Meats

240 gms. from the following list: chicken, squab, turkey, steak, lamb chop, roast beef, lamb's tongue, corned beef, sweet breads (616 calories).

Fish

240 gms. from the following list: perch, cod, mackerel, flounder, sea bass, sea trout, smoked salmon, herring, pickled herring (192 calories).

Soups

540–720 c.c. from the following list: beef, mutton, lamb or chicken broth or vegetable soup from the vegetables in the list given above.

Bread

4 to 5 slices of rye bread (3 by 3 by ½ inches) (336–420 calories)

Butter

120 gms. (2 oz.) (450 calories)

Cereals

3 level tablespoonfuls of oatmeal or wheatena with 30 gms. of sweet cream (168 calories)

Desserts

180 gms. custard (made with cream and egg) or
120 gms. ice cream (made with cream, egg sweetened with glycerine or saccharin) or
2–4 sponge cookies[1] or
30 gms. (1 oz.) chocolate almond bar or
1 cup of chocolate (made from 1 teaspoonful of freshly grated unsweetened chocolate and 30 grams (1 oz.) of sweetened cream) or
½ dozen walnuts, pecans or filberts

[1] Made at Loeb's Diabetic Food Bakery. N. Y. They contain 0.91 per cent. starch

During the month of November the patient began to gain weight. On November 18 she weighed 135 pounds. The blood pressure was 110. The patient seemed well and happy. The urine examination showed sugar and acetone, negative. At this time one slice of white bread (3 by 3 by ½ inches) was substituted for a slice of rye bread. During the two weeks following the patient continued to improve. On December 2, she weighed 135½ pounds. The blood pressure was 110. The urine examination was negative. Another slice of rye bread was withdrawn from the diet and white bread substituted. On December 9 the patient's weight had increased to 137 pounds. The urine continued to be negative regarding both sugar and acetone. Sixty grams of green peas (2 oz.) were added to the diet.

On December 16, the patient complained of having a severe headache due to constipation. The urine, on examination, was free from sugar and acetone but showed a 2 plus indican reaction. The weight was 137¾ pounds. At this point another slice of white bread was substituted for the rye making 3 slices of white bread in all. From December 20–23 the patient had

a severe cold, coughed considerably. The headache and dizziness complained of on the previous week had disappeared after the patient had taken a dose of calcined magnesia. The urine, on examination, was negative in regard to sugar, acetone and indican. Two ounces of lima beans were added to the tomato. The cold cleared up in a few days and the cough was checked after indicated treatment. The patient continued to gain weight. On December 30, she weighed 139 pounds, a gain of 1¼ pounds in two weeks. On examination the urine continued to be free from sugar, acetone and indican. The patient at this time was allowed four to five slices of white bread instead of the rye. Rice was substituted for the oatmeal and was well tolerated.

Referring again to general treatment (page 39) considerable misunderstanding prevails regarding the value of cultures of *Bacillus Bulgaricus* in the treatment of diabetes, due to a faulty conception of the causative factors involved.

While many successes have been attained by the use of cultures, almost as many failures have resulted because the pathologic condition involved has been overlooked. In the majority of cases where lack of success has attended the

use of the culture, the failure has resulted from want of a proper restriction in diet.

Granting that the etiology of diabetes mellitus as given on page 5 is correct, then the use of the previously mentioned cultures with little or no attention to proper diet, can be of value only in the initial or irritative stage. The only cases which have been treated successfully, when no dietary restrictions have been observed, are those in which the condition was in the initial, irritative stage. Where failure attended the use of cultures, this failure was due to the lack of proper dietary restrictions.

It is true that the *Bacillus Bulgaricus* will aid in reducing and eliminating the intestinal toxemia, but it cannot bring the organically changed pancreas back to its normal condition. For this reason, dietary changes must be instituted in order that the organ may be given an opportunity to regain its power to function.

Neither in the original report[1] on the use of the *Bacillus Bulgaricus* nor in any subsequent paper has it been claimed that the culture is a cure. It is merely claimed that it accomplishes

[1] Paper read before the Section of Medicine of the New York Academy of Medicine, May 19, 1914.

two things: (*a*) helps to take care of and neutralize an existing (auto) toxemia; (*b*) increases the time necessary for starch to be converted into dextrose or glucose, so that smaller quantities of glucose are formed in a given time.

In cases where the cultures are used a considerably higher tolerance is obtained in a much shorter time than without their use. Large doses have been found to produce the best results.

I prescribe from 16 to 64 c.c. of an almost sugar-free bouillon culture three times a day, half an hour before meals. It is frequently found that although very large doses are given, the toxemia persists as shown by the large amount of indican present or the high percentage of etherial sulphates excreted. This is due to the fact that the toxemia is in many cases so severe that the bacilli are destroyed before they can set up a proper colonization in the colon. In these cases a retention enema of 128–192 c.c. of the culture is given after the bowel has been thoroughly cleansed in the manner described in Chapter VI. In this way we obtain a colonization from below and the toxemia is usually quickly subdued.

CHAPTER III

MODERATELY SEVERE DIABETES

Cases of moderately severe diabetes usually give the classic symptoms. These patients are either mild cases that have been neglected, or those who have been in perfect health and, for no apparent reason, have begun to lose flesh and strength, and exhibit polydipsia and polyuria. Very often they ascribe their trouble to a severe shock or to a sudden misfortune which has visited the family. Some time after the supposed shock, which is considered the cause of the ailment, the patient begins to feel ill; gradually grows weaker and weaker, tires easily and loses from 20 to 30 pounds in weight. Some patients sleep fairly well, others complain of lack of sleep; all generally lack energy or ambition. They are nervous and irritable, their power of concentration is slightly below par.

On examination, soon after the onset, we find that they have lost flesh; the tongue is dry and coated; the great majority wet their lips, making a peculiar smacking sound as though the mouth were very dry. The urine is usually of high

specific gravity, between 1.030 and 1.035 and shows from 3½ to 6 per cent. of sugar. A few of the cases show an acidosis and, occasionally, some have a trace of albumin, with or without casts (usually of the hyaline type). If acetone be present, it is from 2 to 3 plus, and there may be a faint trace of diacetic acid. The blood sugar is usually between 0.17 and 0.24 per cent. Women may complain of pruritus vulvae (itching of the genitals) and may have an eczematous rash.

A history of constipation is usual, accompanied by headache and dizziness. Any exertion renders these patients very weak. A very few in this class complain of eye symptoms—diminished vision, and a sensation as if there were a mist before the eyes. Some have pains of neuralgic character, either in the arms or legs.

Others complain only of the neuralgic symptoms and ascribe all their trouble—reduction in weight, and other symptoms—to the fact that they have pain. The unsuspected glycosuria is revealed by the urinanalysis. When their rations are reduced, they invariably show an acidosis even if they had none before treatment. It is advisable with the reduction in diet to

relieve the constipation and endeavor to ameliorate the pains and weakness. These patients should be put to bed and kept there from four to seven days.

The first diet is:

600 grams 5 per cent. green vegetables

540 c.c. (3 cups, 6 oz. each) black coffee

720 c.c. (4 cups, 6 oz. each) chicken broth

1000 c.c. of lemonade made from the juice of one lemon sweetened either with saxin, saccharin, or crystallose.[1]

This diet is maintained for at least twenty-four hours after the urine has become sugar-free.

In stubborn cases of constipation, the patient is given an irrigation night and morning with four quarts of plain warm water or warm saline solution, depending upon whether or not the kidneys are involved.

It is an open question whether the use of sodium chloride is advisable for a severe diabetic. Some claim salt to be necessary, since without it, the patient becomes very thin. Others claim that sodium chloride when taken in large quantities may increase the sugar output. If no kid-

[1] It is important that too much saccharin is not used, as it is cumulative in action.

ney complication exists, I permit the use of salt in fair amounts and allow the cooking of vegetables in salted water. However, I have seen a marked edema present in diabetics who were consuming large quantities of salt—especially in cases complicated by acidosis.

Severe purging is to be avoided, as it increases an already existing weakness. A purgative of some preparation of calcined magnesia gives the best results with the least disturbance of the general system. Its mild chologogic action rids the liver of considerable toxin.

When the urine has been sugar-free for twenty-four hours the diet is increased by:

3 hard-boiled eggs (boiled 20 minutes)

1000 c.c. of lemonade (1 liter of water and the juice of 1 lemon or a drink made of cracked cocoa and hot water.

At the end of 48 hours, 60 grams (2 oz.) of white meat of chicken may be added to the above.

At this stage, symptoms of acidosis frequently appear; the urine may be loaded with acetone and diacetic acid, and the patient may also have an acetone breath. Severe headache and nausea and much weakness or languor are present. Occasionally there will be sudden bloating, a

condition which, while rare in this form of diabetes, is quite common in the very severe form. This is a grave symptom and requires immediate attention as it is the forerunner of coma.

If sudden edema occurs, the patient is put to bed at once (if he is not already there) and the body is kept warm by hot water bottles. One quart of Kalak[1] water and two level tablespoonfuls of well-cooked oatmeal are added to the diet.

The continued use of large doses of bicarbonate of soda is to be avoided as this treatment upsets the digestion, and tends to liberate ace-

[1] Kalak water is an artificial preparation containing the following:

	Parts per Million
Total solids (1100 c.).....	5730
Total solids after ignition to red heat.....	5595
	135 loss of carbon dioxide

The solids are divided as follows:

Sodium carbonate.....	4049.00
Sodium phosphate.....	238.50
Sodium chloride.....	806.3
Calcium carbonate.....	578.2
Magnesium carbonate.....	48.9
Potassium chloride.....	47.9
	5768.8

tone by breaking up the compounds in the system. If the symptoms persist, however, good results are usually obtained by giving a Murphy drip of bicarbonate of soda every six hours (30 grams of bicarbonate of soda to a quart of water) until the symptoms subside and the urine becomes alkaline.

A reliable test of the severity of the acidosis is the length of time required for the urine to become alkaline in reaction. As soon as the tested urine shows this alkaline reaction and the other symptoms subside, the Murphy drip of bicarbonate of soda is discontinued. There is usually no recurrence of sugar with the use of the oatmeal, but, if sugar should appear, the oatmeal is omitted and the slight glycosuria disappears within twenty-four hours.

Beginning with Diet No. 2 the menu is now increased as in the mild cases, the increase, however, being more gradual. The eye symptoms and the neuritis usually clear up with the disappearance of the glycosuria and acidosis. A severe case of neuritis will seldom persist when the patient is otherwise doing well. If, however, the neuritis still is present, treatment will depend

upon the conditions found. Often the galvanic current, applied with the positive pole (anode) on the affected limb, and the negative pole (cathode) at some other part (for example, the back) will relieve the symptoms.

Inasmuch as the diet is increased gradually in the moderate and the severe forms of diabetes, we must often resort to articles of diet which have little or no food value. "Jell-agar" may be prescribed, a jelly made of agar-agar[1] and Indian gum flavored with saccharin or glycerin and a fruit extract, or a special marmalade[2] made of agar-agar. The marmalade, however, contains about 1.5 per cent. fruit sugar and must be used with caution. Gelatine flavored with coffee, chocolate, lemon, or small amounts of fruit juice may also be prescribed.

[1] METHOD. The agar-agar and the Indian gum should first be dissolved in hot water; the other ingredients should then be added.

Water (1 quart)	910 grams
Agar-agar	20 grams
India gum	10 grams
Benzoate of soda	1 gram
Saccharin	¼ gram
Citric acid	¼ teaspoon
Glycerine (1 ounce)	30 grams
Extract raspberry (sugarless) (1½ pts.)	700 grams

[2] These articles are made by Lister Brothers.

CHAPTER IV

SEVERE DIABETES

Severe cases of diabetes tax the patience of both doctor and patient. Whereas, the moderate cases may only occasionally exhibit eye symptoms, patients having very severe diabetes may show these symptoms, frequently as well as marked acidosis, nephritis or general neuritis. These cases are frequently of the chronic type, though, occasionally, they are of short duration but fulminating in character. Often the glycosuria is slight—only a fraction of 1 per cent—and of long standing, treatment having been begun not on account of the glycosuria but for loss of vision, edema of the legs, or incipient gangrenous involvement of the extremities. The patients almost always exhibit arterial changes and have relatively high blood pressure. One of the reasons why these cases show little sugar or only a faint trace of it in the urine is because of an accompanying Bright's disease, which causes the kidney to become impermeable. The blood sugar is always fairly high. The following case illustrates these points.

CASE No. 343. S. S. Russian. Family history, negative. Never ill until about eighteen years ago when sugar was discovered in the urine on examination. The patient had never had much sugar and thought she was doing well. The sight of the right eye was destroyed, the sight of the left eye was so badly impaired that she could hardly observe objects. On examination, the urine was found to contain over 5 per cent. sugar, a pronounced trace of albumin and granular casts. Blood pressure 150. Under treatment the diabetic condition cleared up but the eye symptoms and kidney condition remained unchanged.

The following case in which eye symptoms were present but less severe in form was referred to me by Dr. Charles H. May. In this instance after the clearing up of the diabetic condition the sight returned.

CASE 335. MRS. I. L. American. Family history negative. The patient had diabetes for 30 years and during this period had lost over 80 pounds in weight. In the last few years Mrs. L. experienced impaired vision with neuritis

in the fingers and toes. When she came under my treatment the urine examination showed 3.12 per cent. sugar content, but, this percentage was high, as the average had been 0.6 per cent., the acetone 2 plus, the blood sugar 0.20 per cent. and the urea nitrogen 31 mg. per 100 c.c. of blood. There was also a trace of albumin in the urine. The sugar cleared up under treatment and the eyesight returned almost to normal.

The following is a case of the fulminating type as far as the eyesight is concerned.

Case No. 320. Mrs. R. S. Age 33. Russian. Family history, negative. Condition began 2 years ago with marked thirst and hunger, itch, loss of flesh and strength and diminution of vision. Examination showed the urine to contain over 4 per cent. sugar, 4 plus acetone, and and 4 plus diacetic acid. The blood sugar was 0.30 per cent. At the beginning of the treatment she was markedly edematous, but the swollen condition cleared up and the blood sugar came down to 0.12 per cent. However, she did not follow up the treatment, often breaking dietetic

rules and finally, the writer's oversight of the patient was discontinued. When last heard from she was absolutely blind.

The following case, seen in consultation, exemplifies gangrenous involvement:

CASE No. 223. I. C. Russian. Family history revealed diabetes and Bright's disease among brothers and sisters. The patient had diabetes for years, but showed only occasional traces of sugar, had not been under a physician's care but sent urine specimen regularly to laboratories. The patient suffered from impaired circulation in both extremities; on examination gave a history of varicose ulcer of the right leg which had come on five weeks previously. This ulcer would not heal, and, on June 15, 1919, showed definite gangrenous condition involving the leg to a point above the knee. The urine showed only a trace of sugar, but contained 0.45 per cent. of albumin with hyalin and granular casts and occasional red blood cells. The blood sugar was 0.25 per cent. despite the fact that only a trace appeared in the urine. The creatinine was 3 mgs. per 100 c.c. of blood. This patient

collapsed suddenly before amputation could be performed, and died in coma.

Cases of this type should be put to bed at once; the bowels should then be cleared out immediately. In view of the exhaustion and marked acidosis, it is not advisable to cut down to a rigid diet at once. It is far better to cut out the fats first, otherwise maintaining the diet to which the patient is accustomed without making any changes in the protein and carbohydrate content. After a few days the proteins can be reduced and at the end of about a week the following may be given:

720 grams (24 oz.) of 5 per cent. green vegetables

540 c.c. (3 cups, 6 oz. each) of black coffee

540–720 c.c. (3 cups, 6 oz. each) of chicken broth

3 hard-boiled eggs (20 minutes)

1000 c.c. (1 quart) of lemonade and either Kalak or Vichy-Celestin

At the same time such patients are given one or two irrigations daily, simply to flush the bowels.

In the early stages of the treatment patients with eye symptoms invariably complain of further diminution in vision. This circumstance should not be permitted to worry the patient for with the increase in diet, unless the damage to the retina is beyond repair, the sight will gradually improve.

Complications

The most difficult cases of diabetes are those complicated with *nephritis.* Our ultimate aim should be to provide a well-balanced mixed diet. The patient, however, must start with a diet of the protein type. In view of the kidney complication, the problem of tiding over the first part of the treatment, when no fat and very little carbohydrate can be tolerated, is difficult. The following diet is employed when such complications exist:

600–800 grams (20–25 oz.) of 5 per cent. green vegetables

540 c.c. (3 cups, 6 oz. each) of black coffee

540–720 c.c. (3–4 cups, 6 oz. each) of broth

3 hard-boiled eggs (20 minutes)

60 grams (2 oz.) white meat of chicken

2–3 level tablespoonfuls of oatmeal (if the blood sugar is down)

3 grams (1 inch) of Luft bread

On account of the high protein content we omit bread made of Lister flour until the condition has reached a point where this bread could cause no disturbance. This point varies with each individual case and careful experiment is all that can be suggested.

After the patient is sugar-free and has remained so for from twenty-four to forty-eight hours, the diet is increased as follows:

900 grams (30 oz.) of 5 per cent. green vegetables, or

300 grams (10 oz.) of 10 per cent. vegetables, distributed through the day and

300 grams (10 oz.) of the 5 per cent. vegetable. (*See* Table No. I).

540 c.c. (3 cups, 6 oz. each) of coffee, without cream

3 eggs, boiled 20 minutes

120 grams (4 oz.) white meat of chicken

2–3 level tablespoonfuls of oatmeal, no cream

60 grams (2 oz.) plain boiled or broiled fish (no butter)

If the acidosis has disappeared, I gradually add fats to the diet, not over 30 grams (1 oz. in the form of cream cheese which consists of about 10 grams of fat. Quite frequently only 15 grams (½ oz.) of cream cheese can be tolerated in cases where the patient shows any tendency toward a recurrence of the acidosis. Some cases complicated by nephritis have a good protein tolerance; in others even egg protein may cause a disturbance. This also applies to the use of liquids. Some patients can tolerate one or two quarts per day while others, with marked edema can tolerate very little. Care is necessary in the use of salt; only the amount necessary to render the food palatable should be permitted. Too much salt may cause an edema and increase the excretion of albumin.

As the patient improves, the diet is increased as set forth in the section dealing with mild cases, but the proteins and fats prescribed must not be sufficient to irritate a possible existing nephritis or acidosis.

In the case of *gangrenous complication,* the surgeon will have to decide upon the appropriate treatment and régime. If the symptoms are

grave and the involvement extensive, amputation is indicated. If the complication be mild, elimination of the sugar will quite often cause a subsidence of the condition.

Fulminating cases are sometimes encountered. Fortunately, these are not very common. They show what Mendel and Lusk have called "the fatal ratio," after twenty-four hours on a protein and fat diet with carbohydrates removed, the urine collected will show a dextrose to nitrogen ratio of 3.65:1. Such cases generally display a complete intolerance and usually end fatally in spite of all treatment. Cases showing the above ratio of dextrose to nitrogen are known as "Absolute Diabetics" (Chapter I).

Tuberculosis often offers complications in severe diabetes. The percentage of deaths from this complication has recently been greatly reduced. There was a time when diabetes was accompanied by tuberculosis in as high as 45 to 50 per cent. of the cases; now the range is between 14 and 18 per cent. In my own practice the percentage of diabetic cases with tubercular complications has been very low, between 6 and 8 per cent. Almost all of my patients are

in good circumstances and live in hygienic surroundings—the probable explanation of this low percentage. The following case is one of diabetes complicated by tuberculosis.

Case No. 299. C. K. Age 54. Native of the United States. Family history negative as to diabetes and tuberculosis; the father died of Bright's disease. The patient had no illnesses except the ordinary diseases of childhood. The present trouble started three years ago with thirst, polyuria, and loss of flesh. When the patient presented himself in November 1917, he was very thin and debilitated; complained of shortness of breath, cough in the morning, drowsiness in the afternoon and loss of appetite. The bowels were in fairly good condition. Pulse 150; temperature 100.6; blood pressure 115; height 5 feet, 6 inches; weight 92½ pounds. Dullness, and bronchial voice and breathing were detected in the middle of the lower lobe and anterior aspect of the right lung.

The urine showed a large amount of sugar, but no acetone, diacetic acid or albumin. The patient was placed under treatment and improved

slightly. The sugar disappeared entirely from the urine and the cough diminished a little. The patient felt better and was more cheerful. Examination of the sputum showed the presence of tubercle bacilli. The patient eventually died of tuberculosis.

In such cases both diseases need care and treatment—treatment to eliminate the diabetic condition and also to prevent the extension of the tubercular processes in the lungs and throat (larynx).

Cancer, as a complication of diabetes occurs in a small percentage of cases. Four cases of this type have been present in my series, one involving the vertebrae, one the shoulder joint, one the uterus and one the throat. The last mentioned is cited in the following case:

CASE No. 190. B. F. S. Age 58. Family history negative. The patient had had no illnesses except typhoid fever at eighteen, and ague. The present trouble dated back thirteen years, beginning with thirst, polyuria, and loss of flesh. The patient had had an infected toe amputated. He had been under treatment pre-

viously for diabetes and had become free of sugar and acetone. Lately the acetone had reappeared and had been persisting. About a year ago a white cauliflower formation appeared on the right side of the throat and spread gradually over the tonsil. Pathological examination revealed epithelioma of the tonsils. The growth was arrested for a number of months, later it began to grow again and filled part of the mouth and cheek. The urine contained 5 per cent. sugar, 3 plus acetone and 1 plus diacetic acid. Under treatment the diabetic trouble cleared up. The patient was referred to a prominent surgeon who considered the case inoperable. The radium treatment, which was suggested, failed to act on the cancer. The patient finally died of the cancerous growth.

Arteriosclerosis develops in a great number of elderly patients whose cases are of long standing, especially when associated with Bright's disease. I have never found it where the diabetes was otherwise uncomplicated, except in the following case of a girl twenty-four years old who showed no symptoms of kidney involvement:

CASE No. 234. M. F. Age 24. Family history negative. The patient gave no history of illnesses except, possibly, malaria in childhood. The present trouble started, about eighteen months previous to the time when she appeared for examination, with pruritus, polydipsia and polyuria.

At first she lost weight and later gained it again. She had shown 6 per cent. sugar; however, when she came under treatment, only 2.8 per cent. was present with large amounts of acetone and diacetic acid.

At this time the patient really looked and felt very well; was neither tired nor drowsy, had no headache, and did not complain of constipation. Weight 107½ pounds. Abdomen and eyes normal. Pain over the gall bladder, cecum and sigmoid on palpation; tongue coated; urine showed sugar and large amounts of acetone and diacetic acid. There was definite hardening of the arteries and the blood pressure was 160–170. Neither the urine nor the blood showed nephritic complications. The patient gradually grew worse and died four years later in a state of coma.

It is in these cases of diabetes complicated with arteriosclerosis that we get gangrenous involvement. I have seen eight cases in all, five male and three female.

Acidosis is the most formidable of all the complications and is responsible for the greatest number of deaths. This condition is most to be feared; good judgment and rapid treatment are necessary in order to ward off coma.

Symptoms which should not be over-looked are headache, marked weakness, nausea, vomiting and great restlessness. A patient who shows the presence of a large amount of acetone and diacetic acid in the urine, and who begins to complain of the symptoms just listed, should be put to bed at once. Quite frequently a patient will begin to show the symptoms of impending coma at a time when the doctor might be tempted to overlook the condition on account of the absence of acetone bodies in the urine. It is obvious, however, that acetone bodies may in these cases, exist in the blood, but may fail to be excreted because of a complicating Bright's disease, and the impermeability of the kidneys. This condition emphasizes the importance of a

thorough examination when the patient first presents himself for treatment. A carbon dioxide tension test should be made from time to time, if conditions warrant it.

In case of threatening coma the patient should be kept warm by placing hot water bottles around the body. The bowels should be promptly emptied by hot irrigations. A sufficient amount of fluid should be given to dilute the toxins. In a number of my cases which showed a marked acidosis the first symptom of trouble was a sudden edema. Fortunately in all but one case the symptoms were recognized early and the patients recovered. The exception was a woman of 34, whose case is here given.

Case No. 267. N. R. W. Family history negative. The patient never had an illness until about seven years ago, when the present condition was discovered during pregnancy. She then displayed the usual symptoms of polyuria and polydipsia and had a sugar index of 8 per cent. The condition cleared up after the birth of the child and she remained sugar-free for about a year. Sugar reappeared during

a second pregnancy, and, for about a year before coming to me she had sugar in the urine almost constantly. She had been losing flesh progressively, had slight headache, tired easily, and complained of drowsiness in the afternoon. She was slightly constipated; the patient had no eye symptoms, and looked fairly well. Weight 124 pounds; blood pressure 140; liver enlarged; colon thickened; heart normal. Urine examination showed sugar, 3 plus acetone and 3 plus diacetic acid. Blood sugar 0.24 per cent.

The patient was placed under treatment and responded well; blood sugar went down to 0.112 per cent. and then to 0.10 per cent. The urine became normal and remained so for nearly a year. (She was practically well.) However, in the course of a pleasure trip she broke her diet, eating large amounts of fats in the hope of regaining weight. On returning to town, she suddenly felt very ill and began to bloat. The patient died shortly after in coma.

Some cases improve under the general treatment given in the preceding chapters—the symptoms gradually disappear and the acidosis

clears up. Some cases, however, become increasingly worse and under such circumstances the following method has been found successful.

My plan is to avoid the use of bicarbonate of soda, if possible; if the patients do not respond without it, however, I add 15–30 grams (half to one ounce) of bicarbonate of soda to each quart of water used in the irrigation. Six quarts are used at a time, two or three times in twenty-four hours. Often, I use a Murphy drip of bicarbonate of soda between the irrigations.

I also advocate the generous use of Kalak water or Vichy-Celestine, both of which have bicarbonate of soda in their composition; these are not so likely to disturb the stomach or to cause vomiting as the bicarbonate of soda, especially if the latter is given in concentrated doses by mouth.

In severe cases in which the patient is in stupor, I often use a 3 to 4 per cent. sterile bicarbonate of soda solution intravenously, giving from 300 to 500 c.c. If the patient has been on a liberal diet, all fats should be removed and oatmeal added. In some cases this treatment has proved valuable.

Alcohol has been recommended as useful in maintaining the body heat and in aiding in the combustion of acetone bodies, but I rarely prescribe it. If the case is complicated by Bright's disease, alcohol may do more harm than good. When used, I allow from 45 to 90 c.c. (1½ to 3 oz.) in the form of Scotch whiskey, well diluted.

CHAPTER V

JUVENILE DIABETES

The existence of a diabetic condition in children is more common than was formerly believed. With the present methods of examination and facilities for making microcolorimetric tests on the blood (Epstein) many cases are now detected which undoubtedly escaped notice under previous methods of examination. We are able to trace the etiology more readily in children than in adults. The majority of cases give a history of an acute toxemia with its train of symptoms. The child recovers from the attack; sometime later, however, it becomes peevish and irritable and loses weight and strength. Polyuria develops with, perhaps, a rash. An examination of the urine reveals a condition such as is described in the introductory chapter. Other cases exist, however, which seem to develop without any apparent inciting cause. In my experience by far the greater number of cases show a history of intestinal disturbance prior to the glycosuria.

The treatment of diabetes in young children is very difficult and taxes the ingenuity of

both doctor and nurse. It is quite a problem to persuade children to eat green vegetables, but by patience and perseverance, it can be accomplished. Instead of giving the treatment in abstract form I will cite the history and treatment instituted in the two cases[1] which follow:

CASE No. 221. M. D. Age three years. This case came under treatment December, 1915. Except for a maternal grandfather who died of diabetes, the family history was negative. The child had had an attack of bronchitis a year previous to the present trouble; she was subject to slight colds and constipation, and had also had occasional attacks of indigestion.

In September, 1915, after eating some fruit cake the child became very ill with an acute attack of intestinal toxemia. During this attack she was greatly prostrated, but became apparently well in two or three weeks. About the fifteenth of October, the mother noticed that the child was losing weight; became irritable, began to wet the bed, had marked thirst and hunger and complained of severe headache. The poly-

[1] *New York M. J.*, Aug. 30, 1919.

uria was very marked, a gallon of urine being voided in twenty-four hours. The sugar index ranged from 4 to 6 per cent.; no tests were made for acetone or diacetic acid. The diet was reduced and yeast tablets given. At the end of three or four weeks the sugar index became lower, then rose again to 4 per cent. and remained at that point.

When I saw the child on December 30, 1915, she was thin, very drowsy and slept poorly at night; a sugar index of 4.16 per cent. was present and a large amount of acetone and diacetic acid. The child was sent to a private hospital and put on the starvation treatment. At first she was drowsy and listless, but, after two or three days, she seemed to clear up mentally. On the sixth day she suddenly became stuporous, again, and markedly edematous.

The patient began to vomit. The urine was sugar-free, but examination showed that the amount of acetone and diacetic acid had greatly increased. She was immediately given 60 grams of oatmeal, 200 grams of five per cent. green vegetables, and a Murphy drip of bicarbonate of soda. After twenty-four hours the edema grad-

ually diminished and the patient became brighter. From this time on the diet was gradually increased. By the end of January, the patient was so much improved that she was able to get out of bed; she was less irritable, slept better and the drowsiness passed away. Her diet consisted of:

510 grams (17 oz.) of green vegetables
450 c.c. (15 oz.) of broth
150 grams (16 teaspoonfuls) of well-cooked oatmeal
8 c.c. (2 teaspoonfuls) of sweet cream
30 grams (1 oz.) of chicken
2 teaspoonfuls of cream cheese
1 slice of Luft bread, 1 inch thick
1 egg

She also took 6 c.c. of *Bacillus Bulgaricus* four times a day. The bowels were kept open by enemata.

During February and March (1916) she continued to improve. Lamb chops and steak, skimmed milk and chocolate were added to the diet. The patient's general condition seemed to

be gradually improving. The oatmeal was replaced by farina and wheatena from time to time; grape fruit juice and strawberries were given and tolerated. The improvement continued and this diet was well tolerated. However, the patient lost weight, about two pounds in all. Traces of sugar were detected in a few instances when she had taken cold, but this condition disappeared promptly under treatment.

When the patient left the hospital, her diet for every twenty-four hours consisted of:

450 grams (15 oz.) of green vegetables
15 gms. (4½ inches) of Luft bread (26 per cent. starch and 50 per cent. protein)
30 grams (1 oz.) of chicken, steak or lamb
50 c.c. (10 teaspoonfuls) of milk
30 c.c. (6 teaspoonfuls) of cream
8 gms. (2 teaspoonfuls) of cream cheese
1 teaspoonful of unsweetened chocolate
6 strawberries
60 gms. (4 tablespoonfuls) of grape fruit juice
1 egg

In December, 1917, after an illness of less than a week, the patient died suddenly. As far

as I have been able to discover, her death was due to a pulmonary condition, probably pneumonia. My information, however, was not received directly from the family physician or members of the child's family.

Case No. 263. W. N., a boy of two years. First came under my care in January, 1917. Family history was negative to diabetes. The patient was a healthy, robust, well-developed child who had never been ill before. During the early part of October, 1916, he had had an acute attack of intestinal toxemia. About four weeks later, when he had fully recovered, sugar was discovered in the urine. In the two months intervening between this illness and the subsequent examination considerable weight and strength were lost. The urine showed a large amount of sugar and acetone, but no diacetic acid.

When I first saw the boy he looked very ill, the typical picture of a marasmic child. He was thin; the skin was very red and drawn tightly over his little frame. He was also very irritable, and whined instead of crying. Heart and lungs were normal. The urine examination showed

about 4 per cent. sugar, a large amount of acetone, diacetic acid and indican, 0.02 per cent. of albumin, occasional hyaline and numerous fine, granular casts.

He was sent to the hospital, where he remained until the middle of May. At first he was put upon the following diet:

180 gms. (6 oz.) of 5 per cent. green vegetables
8 c.c. (2 teaspoonfuls) of whisky
180 c.c. (1 cup) of broth
1 bottle of Kalak water
5 c.c. of *Bacillus Bulgaricus* culture

After three days he was much better and less irritable. His diet was increased, as he could tolerate it, and his condition improved. In November, 1917, the patient looked still better and felt well. The child had gained weight, weighing then 22 pounds. In January, 1918, he was much better, had a good color, slept well and weighed 26¼ pounds. The urine examination was negative, free from sugar, albumin or casts. At this time the diet was increased to the following:

120 gms. (24 teaspoonfuls) of well-cooked oatmeal

480 gms. (16 oz.) of 5 per cent. green vegetables

360 c.c. (2 cups) of broth

2 teaspoonfuls of unsweetened chocolate

60 gms. (1 oz.) of chicken

2 eggs

25 c.c. (5 teaspoonfuls) of sweet cream

1 lamb chop twice a week

The *Bacillus Bulgaricus* culture was given twice daily.

In May, 1918, the child weighed 27½ pounds. The urine examination was normal. The diet was increased to two ounces (60 gms.) of chicken, one teaspoonful of grape juice and rhubarb, sweetened with saccharin. The cultures were discontinued.

On February 2, 1919, he looked the picture of health and seemed absolutely normal. He weighed 29 pounds, 11 ounces—a gain of nearly ten pounds since the beginning of treatment. On examination the urine was normal. When seen again in July, 1919, the child had gained in

weight and had lost the distended abdomen which was so marked at first. He now plays around with other children, and nothing in his appearance would indicate that he has ever been ill.

CHAPTER VI

HYGIENE AND EXERCISE

Teeth. The important part that hygiene plays in the treatment of diabetes cannot be overestimated. Very few cases of diabetes exist without some involvement of the teeth or gums. Pyorrhea seems to affect diabetics more than any other class of patients. To avoid this complication, the teeth and gums must be kept clean and in good condition. The teeth should be brushed after every meal and on rising and retiring. Any bland dentifrice or prepared chalk may be used. Any accumulation of food between the teeth should be removed by the use of dental floss. Patients should visit the dentist regularly for the removal of tartar and general prophylactic treatment. All cavities should be filled at once.

Skin. The skin must be kept in good condition, as furunculosis is a very common complication. Frequent baths are a necessity except in the very severe forms of diabetes when nephritic complications are present, and great care must be exercised not to chill the skin. With proper

precautions the skin can be kept in good condition by sponging and massage. Care must be taken not to abrade the surface of the skin since any injury may lead to infection and cause a general septicemia. Very frequently serious infections result from the cut of the manicurist or the chiropodist

If furuncles should develop, keep the sites very clean and do not injure the surrounding parts. Local applications may often be used. Boils can frequently be aborted, if, at the very beginning, they are painted with iodine. However, when they have already developed, iodine is not very effective. The furuncle may be covered with carbolized vaseline or salicylic ointment. Boric acid dressings are also effective. Yeast may be taken internally. In a number of cases, good results have been reported from yeast treatment. It is advised that from ¼ to ½ cake of yeast be eaten every day. If the skin is broken or scratched, paint the injured part with tincture of iodine and maintain asepsis.

Bowels. Constipation is a troublesome symptom. More than 90 per cent. of the cases I have

treated give a history of it, the severer the case, the more marked has been the constipation present. Marked purging in weak and asthenic patients is to be avoided, since it tends to increase the weakness and to create a susceptibility to intercurrent infections. The bowels must move daily, and, while the use of the coarse vegetables aids in securing the natural evacuation of the bowels to a certain extent, in the majority of cases no result is obtained from this diet alone. In mild cases, much may be accomplished with bland medicaments, such as 15 drops of fluid extract cascara sagrada taken before retiring. Some prefer the tablets; the plain non-sugar coated tablets may be used. These should be taken in amounts ranging from 5 to 10 grains before retiring. In other cases the use of a little compound licorice powder or calcined magnesia works very well. Bran muffins eaten in connection with the regular diet will help considerably, provided the bran used in their preparation contains no starch. (See the special formula in the chapter on recipes, menus, etc.)

In severe cases I usually find some fecal concretion in the cecal region, or some thickening

of the ascending colon. In these cases, especially if complicated with Bright's disease, I secure

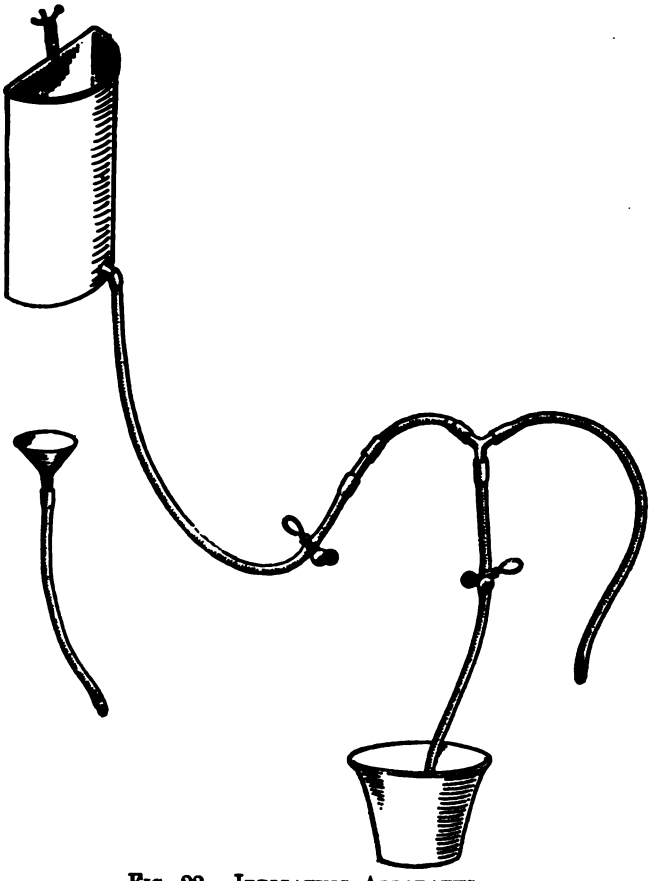


FIG. 22.—IRRIGATING APPARATUS.

good results by irrigating with from 4 to 6 quarts of plain water, followed, one hour later, by a

retention enema of 6 to 8 ounces of lukewarm oil of sesame.

The apparatus used is that indicated in Fig. 22, which consists of a four-quart irrigating can to which is fastened a large rubber tube; at the end of this tube is placed a Y-glass connection. To one of the ends of this glass tube is attached a rectal tube (No. 20 American, or No. 28–30 French size) which is inserted in the rectum. To the other end is attached a rubber tube which leads to a vessel on the floor.

The patient is placed on the left side in the Sims' position. The rectal tube is inserted and the water turned on. Care must be taken to make sure that the tube leading to the vessel on the floor is shut off. When the patient cannot retain any more water, the tube leading from the container is shut off and the lower tube opened. In this way the bowels can be irrigated thoroughly with little discomfort to the patient. One hour later the patient is again placed on his left side, or in the knee-chest position. Through a rectal tube and funnel 6 or 8 ounces of lukewarm oil of sesame[1] are poured into the rectum.

[1] Oil of sesame is employed in preference to cotton seed or olive oil on account of its non-drying properties.

The tube is then withdrawn, and the patient placed on the right side; he remains in this position for twenty minutes. In the majority of cases the oil will be retained and will usually be evacuated in the morning with excellent results. Occasionally it is necessary to give Pluto water or a Seidlitz powder in the morning to expel the oil. In cases of marked acidosis, I give bicarbonate of soda, 30 grams to the quart, without the oil retention enema.

Exercise

Exercise sometimes helps to overcome constipation and to tone up the abdominal muscles. The following forms are advocated:

Abdominal Muscle Exercise. Lie down, with the back flat on the floor, the arms folded on the chest. Sit up without touching the floor with the hands or lifting the legs. Raise the lower extremities without bending them at the knees or moving the arms. Each of these exercises should be repeated about twenty times.

Exercise of Kneading the Abdomen. Start at right groin and work up with a steady even pressure of the hands to the right side under the

ribs; then down to the left groin and over to the right groin again. Repeat these movements about 20 or 30 times. This exercise is sometimes

FIG. 23.—ABDOMINAL MUSCLE EXERCISE.

accomplished by rolling a cannon ball from right to left.

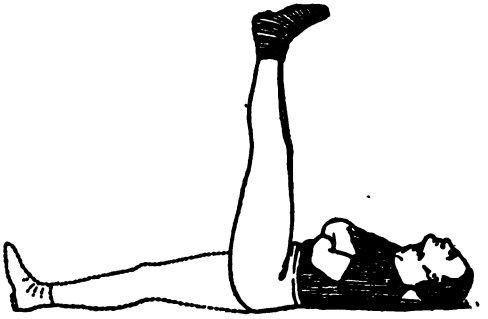


FIG. 24.—ANOTHER TYPE OF EXERCISE TO DEVELOP THE ABDOMINAL MUSCLES.

Massage. Many other exercises are beneficial such as swinging the trunk on the abdomen, also massage and less strenous treatment. The exer-

cise should, of course, be adopted to the constitution of the patient. The purpose of the exercise should be to utilize the carbohydrates and to give the patient the needed strength. In cases accompanied by marked acidosis exercise

FIG. 25.—KNEE-BENDING EXERCISE.

FIG. 26.—TRUNK-TWISTING EXERCISE.

is usually absolutely interdicted; if prescribed at all it must be very mild. Fatigue must be avoided since it may produce coma. In cases in which the urine is free from acidosis and the patient is improving on the diet prescribed, exercise is to be encouraged. *Walking* is the best

form of exercise. I advise a walk of three to four miles each day. It helps digestion and utilizes the carbohydrates, thereby increasing the tolerance. It encourages the patient to inhale good clear air.

Golf is also an excellent exercise for those patients who do not care to walk. In the course of the game these patients usually unconsciously cover some three to five miles a day. The severe forms of exercise are to be avoided. Some of the younger patients may be allowed tennis, but this is usually not desirable.

Sleep is as essential as proper diet for diabetics. I recommend between nine and ten hours of sleep a day. The use of drugs to induce sleep should be avoided as much as possible. If, however, the insomnia is very persistent and all physical means for inducing sleep fail to give results, 5 grains of veronal, medonal or adaline may be given.

An *alcohol rub*, after a cool sponge, is usually sufficient to induce sleep, especially if the patient has taken sufficient exercise during the day. A cup of warm broth before retiring is sometimes efficacious.

CHAPTER VII

MENUS, RECIPES AND TABLES

The great difficulty in the treatment of diabetes is to provide sufficient variety of food in order that the patient may not tire of the régime. The following tables, menus and recipes are given to indicate what combinations of dishes may be made and how the prescribed food can be rendered attractive to the diabetic so that his restricted diet continues to be palatable. The physician must in each instance decide the proper components of the diet. The following recipes, therefore, are not to be used promiscuously. From these recipes the physician can select the diet suitable for the individual case.

A number of the tables used are extracts from the bulletins issued by the Connecticut Agricultural Experimental Station,[1] and the United States Department of Agriculture.[2]

[1] Food Products and Drugs, 1913. Part I, Section I, Diabetic Foods, of the 1913 Annual Report of the Connecticut Agricultural Experimental Station.

[2] The Chemical Composition of American Food Material (Bull. No. 28, 1906).

It must be borne in mind at all times that the recommendation of certain articles of food appearing in the lists of certain manufacturers does not mean that other articles of food made by the same manufacturers are equally valuable for diabetics.

The various firms which handle diabetic foods often attempt to force upon patients a great number of the articles which they have to sell. This situation should be explained to patients before sending them to any of the establishments. Patients should also be warned against buying any of the so-called "diabetic breads" without first consulting the physician and ascertaining the carbohydrate content. Often these "diabetic breads" contain considerably more carbohydrates than ordinary breads. It is far better therefore to use those of known carbohydrate content than to experiment with new ones.

General Directions

In following the directions for the recipes, large eggs should be used. If you have only small eggs it is best to leave out about a teaspoonful of the flour.

You cannot make the diabetic bread unless you use the special size pan described in the directions.

When making the bread "folding in" the flour is often mentioned. This is done by placing the spoon in the dough in the far side of the bowl, drawing it along the bottom, then across the top of the dough, in a circular motion, over and over.

Well washed bran contains from 2 to 4 per cent. of starch that cannot be removed by washing. Lister's starchless bran is entirely free from starch.

Cream mentioned means "heavy cream"—40 per cent. cream, which has about 3 per cent. of milk sugar. When it is desirable to remove the milk sugar, use the following method worked out by Dr. Clifford Mitchell of Chicago.

Add to the amount of cream to be used 10 per cent. to 15 per cent. of water and shake well. Let stand several hours, then skim off the cream that rises and throw away the water.

In calculating the contents of the several foods made from Lister's diabetic flour, no ac-

count is taken of the loss of fat which usually amounts to about 10 per cent. in the baking.

Diabetic Bread

Read directions through carefully before beginning to prepare the bread.

1 Box Lister's diabetic flour

3 Eggs (Use three large eggs or four small eggs.)

Method. Separate whites and yolks of eggs. Add a pinch of salt to whites and beat with egg beater until stiff. Beat yolks with egg beater until thick, combine the beaten whites and beaten yolks and beat with egg beater. Into the beaten eggs, fold gradually with a spoon one box of Lister's flour. Do not stir the mixture. Place in a Lister's baking pan, well buttered. If the directions have been properly followed the mixture will fill the baking pan about half full.

Light both burners of the gas oven full heat for five minutes before placing the bread in the oven to bake, then turn both burners half way off and bake the mixture fifteen minutes, then turn both burners as low as possible and bake fifteen to twenty minutes longer. Care must be used

in opening the oven door while bread is baking. Remove bread from oven, leave in pan until partly cool, remove from pan and when entirely cool, wrap in towel and keep in bread box with other bread.

If bread falls in at sides or top it has not been baked enough at low heat. If bread does not fill the pan when baked the mixture was stirred. If mixture runs over in oven, the flour was not well folded in or the oven was not hot enough at first.

Directions must be exactly followed to obtain satisfactory results. When properly made the bread will be light and palatable. When coal stove or wood stove is used the heat of the oven should be nearly the same as when baking sponge cake.

To relieve constipation wash ½ cup of bran one hour in a cheese cloth, wring dry, and add it to one box of Lister's flour and proceed as usual in making diabetic bread with three large eggs.

Each Loaf contains protein, 57 grams; fat 18.6 grams. Calories 400. When divided into five slices each slice gives the food value of about one egg.

NOTE. One half cup of washed bran is equal to about forty grams; if it is well washed, there will remain but about one gram of starch. When this washed bran is added to one box of Lister's diabetic flour, the bread will then contain about 1 per cent. of starch. For cases requiring entire absence of carbohydrates, Lister Brothers, Inc., furnish a strictly starch-free bran.

A special sized baking dish is necessary when making the bread. This baking dish should be 3 inches wide, 5 inches long, and 3 inches high, with straight sides.

DUMPLINGS

1 egg

2 Tablespoonfuls of Lister's flour.

METHOD. Beat egg up well. When one quart of salt water comes to a boil, stir the flour and the egg well together and with a teaspoon drop into the boiling water. Let this boil for about seven minutes. Then take out the dumplings and put some hot brown butter over them and serve hot.

If made into four dumplings, each dumpling will contain: protein, 5.25 grams; fats 1.5 grams. Calories, 35.

French Toast

1 Egg
2 or 3 tablespoonfuls cream
(or 2 eggs and no cream)
Diabetic muffins biscuits or bread

Beat the eggs and cream together.

Slice Lister's muffins, biscuits or bread. Soak the slices in the egg and dry in hot sweet butter until light brown.

Cheese Pudding

3 Dried muffins
½ Cup thin cream
2 Eggs
½ Cup grated cheese
1 Tablespoonful melted butter
Pinch of salt

Method. Crumb the muffins and soak in the cream which has been slightly warmed; add the beaten egg yolks, salt, cheese and melted butter and lastly fold in the whites of the eggs beaten stiff. Turn into a well-greased pan and bake in a moderate oven for 20 to 25 minutes.

Contains: proteins, 84 grams; carbohydrates, 2 grams; fats, 58 grams. Calories, 144.

Diabetic Muffins

1 Box Lister's flour
1 Egg
2 Tablespoonfuls of bacon fat
3 Tablespoonfuls cream

(Same quantity of butter, melted lard or prepared fat may be used in place of bacon fat).

Method. Beat whole egg, add the bacon fat (butter or melted lard, or melted prepared fat); heat again, then add the flour, beating the mixture while the flour is slowly added. Put in buttered, hot muffin irons and bake for 10 to 20 minutes. If coal range is used, bake for 15 minutes and have the oven hot. Oven door should not be opened for ten minutes. Use old-fashioned cast iron muffin iron.

This will make six muffins of about 80 calories each. If made into eight muffins each muffin will contain: protein, 6 grams; carbohydrates, trace; fat 6.5, grams. Calories, 76. Each of these muffins has practically the same food value as 1 egg.

Pancakes With Bran

1 Egg
2 Tablespoonfuls cream

1 Level teaspoonful of grated cheese

Beat the above ingredients well together

3 Tablespoonfuls washed bran

3 Level tablespoonfuls Lister's diabetic flour

Mix the dry ingredients together and add to the above. Let stand a few minutes and drop with a teaspoon and flatten with spatula.

If made into four pancakes, each will contain: protein, 9 grams; carbohydrates, 3 grams; fats 3.4 grams. Calories, 68.

Diabetic Cookies

1 Box Lister's flour

1 Egg

3 Tablespoonfuls of butter or bacon fat

Method. Beat egg until light—add Lister's flour slowly. A pinch of caraway seed may be added if desired.

Roll very thin and only a small amount at a time.

Bake in hot oven about ten minutes.

Make into 20 cookies. Each cookie will contain; protein, 2.33 grams; fats, 1.25 grams. Calories, 10.50.

Diabetic Pancakes

3 Level tablespoons of Lister's flour (equal to 1 ounce or ½ box)

1 Egg

2 Tablespoonfuls cream

2 heaping teaspoonfuls cottage cheese (pot cheese) or one-half of a Philadelphia cream cheese.

Method. Beat the egg, cream and cheese together. Add flour gradually and fry in hot butter on slow fire. Fry slowly and see that the bottom crust has formed before turning. Make three to six pancakes. Serve very hot.

Care must be taken to turn the pancakes at the proper time. The bottom crust must be firm enough to hold together but not be scorched.

If made into four pancakes each will contain: protein, 9.5 grams; carbohydrates, trace; fats, 3.25 grams. Calories 51.

Diabetic Spice Cake

1 Egg

1 Tablespoonful sweet cream

1 Tablespoonful melted butter

½ to ⅔ box Lister's flour

¼ Teaspoonful allspice
¼ Teaspoonful cinnamon
½ Teaspoonful vanilla extract
2 Crushed saccharin tablets (Lister's).

METHOD. Beat egg, then beat in cream and butter, add spice, saccharin and vanilla. Stir together. Add flour by stirring. Bake in a small angel cake tin in hot oven ten minutes, then turn down heat and bake five minutes longer.

This cake will contain: protein, 46 grams; carbohydrates, trace; fats, 19 grams. Calories, 65.

DIABETIC FLUFF CAKES

1 Box Lister's flour
10 Eggs } Makes 150 Cakes

METHOD. Beat eggs until very stiff. Stir in one box of Lister's flour without further beating. Use flat baking pan that has been slightly greased, deposit the dough or batter in small amounts about the size of a fifty-cent piece. Bake in moderately hot oven for about ten minutes.

Each Cake will contain: protein, 1 gram; fat, 0.65 gram, Calories, 10.

DIABETIC BISCUITS

1 Box of Lister's flour
3 Eggs } Makes 6 Biscuits

(1 Tablespoonful of butter or other shortening may be used.)

METHOD. Separate the whites and yolks of eggs. Add to whites salt to taste. Beat whites until very thick. Beat yolks until thick.

Combine and beat with egg beater. Fold in gradually one box of Lister's Flour.

Each of these Biscuits will contain: protein, 9.75 grams; fat, 3.10 grams. Calories, 67.

DOUGHNUTS

1 Egg
½ Box Lister's diabetic flour
1½ Grain saccharin tablet
1 Tablespoonful cream
¼ Teaspoonful nutmeg
½ Teaspoonful grated rind of lemon (yellow)

METHOD. Mix and let stand one-half hour. Knead with hand for one minute. Roll out to about one-eighth inch thickness. Cut with small doughnut cutter. Fry in smoking hot fat for about one-half minute.

If the doughnuts soak fat, the dough did not stand long enough or the fat was not hot enough or they remained too long in the fat.

If made into five doughnuts, each will contain about: protein, 5 grams; carbohydrates, trace; fats, 2 grams. Calories, 38. (Each doughnut will take up about 2 grams of fat in the frying.)

Flour and Bran Muffins

(Useful in Constipation)

1 Level tablespoonful lard, bacon, fat, butter, or prepared fat.

1 Egg

2 Tablespoonfuls heavy cream

1 Cup washed bran

1 Package Lister's flour

¼ Cup water or less.

Method. Tie dry bran in cheesecloth and soak 1 hour. Wash by squeezing water through and through. several times, wring dry.

Separate egg and beat thoroughly. Add to the egg yolk the melted lard, cream and beaten egg white.

Add the flour, washed bran and water and make into six muffins.

Made into six muffins, each muffin contains approximately: protein, 15 grams; carbohydrates, ½ gram; fat, 5 grams. Calories, 111.

Diabetic Noodles

To the well beaten yolks of two eggs, add two tablespoonfuls of warm water and a little salt.

Slowly stir in one box of Lister's flour.

Knead and roll on pie board

When almost dry—roll and cut fine

Dry thoroughly.

This quantity of noodles will contain about: protein, 46 grams; fats, 13 grams. Calories, 301.

Macaroons

1 Box Lister's diabetic flour

¼ Pound ground almonds

¼ Pound butter

3 Eggs

Saccharin to suit taste

Bake until lightly brown.

The above will make about fifty small macaroons.

Marmalade

Best grade of gelatine...	8 parts
Glycerine.....	1 part
Orange peel and pulp...	10 parts
Saccharin.....	0.1 part or to the taste

Salicylic Acid..... 0.1 part
Water..... 80 parts

Dissolve the gelatine in warm water and add to the glycerine. To this warm mixture add the orange peel, saccharin and salicylic acid. Allow the mixture to stand until cool when the material will be of the consistency of a marmalade or soft jelly. If it is desirable to eliminate all sugar, use 0.3 parts of citric acid and use only the peel of the orange without the pulp. Other preservatives may be used in place of salicylic acid, such as benzoate of soda, borax or boric acid. No preservative is necessary if the marmalade is to be used soon after making.

Jell Agar

Water (1 quart).....	910 grams
Agar-agar.....	20 grams
India gum.....	10 grams
Benzoate of soda.....	1 gram
Saccharin.....	¼ gram
Citric acid.....	¼ teaspoonful
Glycerine (1 ounce)....	30 grams
Extract raspberry (sugar-less)(1½ pts).....	700 grams

METHOD. The agar-agar and the Indian gum should first be dissolved in hot water; the other ingredients should then be added.

SUBSTITUTE FOR DANISH CANDY

20 Grams Agar-Agar
1000 c.c. Water
Saccharin to taste
Flavoring—wintergreen, peppermint or vanilla.

METHOD. Boil about five (5) minutes. Strain and take out undissolved portions; flavor with a few drops of the wintergreen and saccharin.

BREAKFAST PORRIDGE

1 Box Lister's diabetic flour
1 to 1½ cups of cold water
2 Crushed half grain saccharin tablets
Pinch of salt
Pinch of nutmeg

METHOD. Put the water on a slow fire together with saccharin, salt and nutmeg, then stir in briskly, one box of Lister's diabetic flour and let the mixture boil for three minutes.

Sweet, heavy cream may be used as a dressing.

Hepco flour[1] used in the preparation of the following muffins is made from the soya bean. Very often patients who will not be able to tolerate some of the things specified in the foregoing recipes will be able to tolerate food containing Hepco flour. This flour also provides a mixture with a fairly high fat content, hence fat, which is so necessary, may be added to the diet in this way without causing a recurrence of acidosis.

Hepco Biscuits

1½ cupfuls Hepco flour
2 teaspoonfuls baking powder
½ teaspoonful salt
½ teaspoonful poppy seed
3 tablespoonfuls cream
1¼ cupfuls cold water
2 eggs
2 teaspoonfuls melted butter

[1] The analysis of Hepco flour, as made by John Phillips Street, M. S., chemist in charge of the Analytical Laboratory, Connecticut Agricultural Experiment Station, New Haven, Connecticut, is as follows: water, 4.6; ash, 5.1; protein, 42.9; fiber, 4.2; nitrogen-free extract, 22.4; fat, 20.8; starch, trace. Less than 8 per cent. of this consists of sugar forming carbohydrates. This falls well within the limit of safety for diabetics (10 per cent.).

METHOD. Mix the flour, baking powder, salt and poppy seed thoroughly. Stir the cream into the cold water. Beat the two eggs separately. Mix these liquid ingredients, also the melted butter, with the dry ingredients previously mentioned; beat well. Drop the mixture on buttered tins and bake in a hot oven.

These quantities will make 12 muffins.

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued.*

Date of Analysis.	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbohydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Flours and Meals. (*Cont.*)						
	Karl Goldscheider, Carlsbad.						
1909	Conalbin-Mehl No. 1	9.4	10.9	0.4	....	7+	362
1910	Gumpert, Berlin, Ultramehl	6.6	36.5	44.6	....	56+	585
1908	Hazard's Wheat Protein	7.0	41.8	1.2	....	11	374
	Health Food Co., N. Y.						
1906	Almond Meal	8.5	50.6	15.6	7.2	33	407
1913	Almond Meal	7.9	50.3	14.8	Trace	30	406
1911	C B X Cold Blast Flour, 25% Protein	8.7	10.1	0.9	68.9	7	367
1906	Glutosac Gluten Flour	10.1	34.1	1.6	49.3	10	359
1909	Glutosac Gluten Flour	8.0	35.3	0.6	....	10+	367
1911	Glutosac Gluten Flour	8.7	36.6	....	....	?	...
1913	Glutosac Gluten Flour	8.2	39.9	2.3	36.9	11	370
1913	Pronireu (Gluten Griddle Cake Flour)	8.8	37.3	1.2	37.7	11	349
1906	Protosac Gluten Flour	10.6	36.6	0.9	50.0	10	358

1913	Protosac Gluten Flour	8.0	42.7	1.7	36.3	11	372
1913	Protosoy Soy Flour	3.0	42.3	19.8	Trace	21	446
1906	Pure Washed Gluten Flour	6.2	62.4	0.9	27.5	18	376
1913	Pure Washed Gluten Flour	6.1	80.3	1.6	7.0	48	380
	R. Hundhausen, Hamm.						
1892–6	Aleuronat (pure)	8.5	86.1	0.5	....	133	365
1892–6	Aleuronat (less pure)	9.1	77.7	1.2	....	50	364
	Jireh Diabetic Food Co., New York.						
1906	Diabetic Flour	9.3	14.3	2.2	66.6	7	365
1906	Diabetic Flour	11.0	12.1	1.8	....	7	355
1913	Flour	7.6	14.4	2.3	60.9	7	370
1913	Patent Barley	5.0	11.4	1.6	67.8	7	381
1913	Patent Cotton Seed Flour	7.4	49.1	12.7	6.0	25	396
1913	Patent Lentils Flour	5.9	27.3	1.2	42.6	9	359
1913	Protein Flour	7.3	31.4	2.0	48.5	9	370
1913	Soja Bean Flour	4.4	42.3	18.2	0.0	21	435
1906	Wheat and Barley Flour	9.7	11.8	1.9	66.2	7	358
1906	Wheat and Barley Flour	9.5	11.3	1.8	....	7	359
	Johnson Educator Food Co., Boston.						
1906	Educator Standard Gluten Flour	11.3	26.4	1.7	56.8	9	358
1911	Educator Standard Gluten Flour	7.3	40.1	1.4	40.9	11	374
1911	Educator Standard Gluten Flour	8.8	40.1	....	....	?	...
	The Kellogg Food Co., Battle Creek.						
1904	20% Gluten Meal	10.5	15.8	0.6	57.4	7	355
1909	20% Gluten Meal	8.9	21.0	0.8	....	8+	364

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per cent.	Starch, Per Cent.	Weight in grams supplying same amount carbohydrates as 10 gms. Wheat bread.	Calculated Calories per 100 gms.
	Flours and Meals. (*Cont.*)						
	The Kellogg Food Co., Battle Creek.						
1912	20% Gluten Meal	9.8	27.5	0.5	49.6	8	357
1906	40% Gluten Flour	10.5	40.3	1.2	46.9	11	361
1906	40% Gluten Flour	8.5	38.4	1.2	50.0	11	366
1909	40% Gluten Flour	7.9	39.0	1.8	....	11+	373
1912	40% Gluten Flour	9.7	47.0	0.9	31.9	13	359
1913	40% Gluten Flour	8.0	43.7	0.9	40.5	11	367
1909	40% Gluten Flour, Self-Raising	8.8	38.7	1.0	....	11+	365
1909	80% Gluten	7.2	78.8	0.9	....	42+	373
1912	80% Gluten	9.1	81.3	0.9	6.2	67	365
	Eugene Loeb, New York.						
1913	Gluten Cracker Meal	9.7	27.8	7.7	40.2	10	394
1913	Imported Gluten Flour	9 2	76.3	0.9	4.4	45	361
1913	Pure Gluten Flour	10.1	40.3	2.4	39.6	11	368

1913	Whole Wheat Flour	1.1	14.6	2.2	54.6	8	360
1913	E. Loeb & Co., New York, Gluten Flour	9.8	43.9	1.1	39.8	12	363
	Thos. Martindale & Co., Philadelphia.						
1913	Special Gluten Flour	8.2	40.3	1.5	41.4	11	371
	Mayflower Mills, Fort Wayne, Ind.						
1913	Bond's Diabetic Flour	9.4	40.2	1.3	40.6	11	366
	Theo. Metcalf Co., Boston, Mass.						
1906	Soja Bean Meal, 5.5% Starch	7.8	39.9	19.1	9.0	21	431
1906	Soja Bean Meal, 7.6% Starch	....	36.8	....	....	?	
1913	Soja Bean Meal, 18.0% Starch	6.5	41.0	20.0	....	21	444
1906	Vegetable Gluten, 20.0% Starch	7.9	61.4	1.6	26.8	19	372
1913	Vegetable Gluten, 8.1% Starch	7.6	80.4	1.5	5.9	54	374
1901–2	H. Niemöller, Gütersloh, Roborat	9.5	82.3	3.7	....	183	374
	Pieser-Livingston Co., Chicago.						
1913	Gluten Flour	8.5	43.3	1.3	38.4	11	370
1913	Gluten Flour	8.7	41.8	1.4	36.5	11	369
	Pure Gluten Food Co., New York.						
1904	Gum Gluten Flour	....	54.3	....	....	?	...
1911	Gum Gluten Flour	8.1	38.3	1.6	42.4	10	371
1902–3	Gum Gluten Ground	11.9	26.8	1.4	....	9+	356
1904	Gum Gluten Ground	10.6	44.1	1.3	30.0	12	359
1906	Gum Gluten Ground	6.9	50.1	1.9	38.6	13	376
1901	Gum Gluten Self-Raising	9.8	31.5	1.4	....	10	351
1906	Gum Gluten Self-Raising	10.8	37.9	1.0	42.9	12	342
1906	Hoyt's Gum Gluten	11.2	31.8	1.6	52.0	10	358

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight supplying same amount carbohydrates as 10 gms. wheat bread, gms.	Calculated Calories per 100 gms.
	Flours and Meals. (*Cont.*)						
	Pure Gluten Food Co., New York.						
1901	Plain Gluten Flour	9.9	53.6	1.2	....	15	363
1911	Pure Gluten Flour	....	37.9	....	.....	?	...
1911	Pure Gluten Flour	9.1	39.3	....	....	?	...
	Rademann's Nährmittelfabrik, Frankfurt.						
1913	Diabetiker Mehl	9.6	37.9	0.8	46.8	11	362
	Ralston Health Food Co.						
1895	Gluten Flour	12.8	15.0	2.0	....	8	354
1902–3	Gluten Flour	11.9	15.8	0.5	....	7+	351
	Sprague, Warner & Co., Chicago.						
1913	Richelieu Gluten Flour	8.7	49.7	1.2	31.6	13	368
	G. Van Abbott & Sons, London.						
1913	Almond Flour	4.0	24.6	58.6	0.0	67	657
1913	Gluten Flour	10.2	75.1	0.9	12.4	42	359
1913	Gluten Semola	10.1	51.4	2.9	28.2	16	361

	Wilson Bros., Rochester, N. Y.						
1911	Gluten Flour, 5/7 Standard	11.1	19.9	....	....	?	...
1911	Gluten Flour, 5/7 Standard	9.7	19.5	....	....	?	...
1913	Gluten Flour, 5/7 Standard	11.0	20.8	2.1	54.6	8	361
1913	Gluten Flour, Self-Raising, 5/7 Stand.	12.2	17.4	2.0	51.8	8	342
	Protein Preparations.						
	The Bauer Chemical Co., Berlin.						
1912	Sanatogen	10.0	80.1	0.1	....	126+	338
	Eiweiss- Extrakt Co., Altona, Germany.						
1900–1	Soson	6.4	91.2	0.3	....	482+	372
1902	Krecke & Co., Salzuflen, Energin	9.1	83.8	4.5	....	408	381
1913	Menley & James, New York, Glidine	5.7	91.4	0.8	0.0	530	377
	Plasmon Co., London.						
1899–1900	Plasmon, (average 9 analyses)	11.9	70.2	0.7	....	55+	326
1901	Plasmon	8.5	75.0	0.2	....	60+	337
1908	Plasmon	12.4	70.3	0.4	....	58+	322
1909	Plasmon	10.9	78.7	2.7	....	....	339
	Troponwerke, Mülheim.						
1898–1900	Tropon, (average of many analyses)	9.3	86.6	0.2	....	196+	359
1901	Tropon	9.2	88.5	0.3	....	442+	362
	Soft Breads.						
	Ferguson Bakery, Boston, Mass.						
1913	Gluten Bread	37.2	24.2	3.1	25.2	16	259

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbohydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Soft Breads. (*Cont.*)						
	Frank & Co., Bockenheim.						
1892	Protein-Roggenbrot	32.0	23.7	6.2	....	16	283
1892	Protein-Weizenbrot	31.9	23.4	6.3	....	16	284
	Fritz, Vienna.						
.....	Aleuronatbrot	35.5	15.6	0.8	....	11	256
1910	Kleberbrot, Schwarz	....	21.5	....	....	11	...
1910	Litonbrot	....	38.6	....	....	34	...
	Fromm & Co., Dresden.						
1910	Conglutinbrot	....	18.3	....	....	11	...
1910	Litonbrot	....	35.8	....	....	37	...
	Gericke, Potsdam.						
1910	Doppel-Porterbrot	38.6	26.9	....	....	15	...
1910	Doppel-Porterbrot	38.9	21.9	1.5	....	14+	248
1910	Dreifach-Porterbrot	35.1	30.7	6.5	19.8	20	285
1910	Einfach-Porterbrot	30.5	17.8	1.8	....	11+	280

1910	Sifarbrot	39.6	37.3	5.3	12.3	35	257
	Karl Goldscheider, Carlsbad.						
1910	Sinamylbrot	39.1	28.2	4.6	17.3	26	235
	Gumpert, Berlin.						
1910	Diabetiker-Doppel-Schwarzbrot	25.6	18.5	11.8	39.4	13	348
1910	Diabetiker-Doppel-Schwarzbrot	27.9	15.9	12.7	....	13+	346
1910	Diabetiker-Doppel-Weissbrot	23.7	18.8	15.4	36.8	13	371
1910	Diabetiker-Einfach-Schwarzbrot	30.1	15.6	3.4	....	11+	291
1910	Diabetiker-Einfach-Weissbrot	29.4	16.2	6.5	....	11+	309
1910	Ultrabrot	27.9	28.2	32.2	6.8	68	434
1892	F. Günther, Frankfurt, Kleberbrot	33.7	17.2	0.5	....	12	255
	Health Food Co., New York.						
1906	Glutosac Bread	31.5	27.4	2.7	29.9	15	278
1906	Protosac Bread	27.3	32.5	1.6	33.1	14	292
	R. Hundhausen, Hamm.						
1892–6	Aleuronatbrot, low gluten	39.6	17.3	0.3	....	13	234
	Jireh Diabetic Food Co., New York.						
1906	Whole Wheat Bread	39.2	9.4	0.4	43.8	11	236
1913	Whole Wheat Bread (not fresh)	21.8	12.4	0.7	44.9	9	304
	Eugene Loeb, New York.						
1913	P. & L. Genuine Gluten Bread	31.4	10.4	2.6	44.2	10	280
	Rademann's Nährmittelfabrik, Frankfurt						
1910	Diabetiker-Grahambrot	31.7	9.8	5.1	45.6	11	283
1910	Diabetiker-Schwarzbrot (dry)	....	37.8	....	....	16	...

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in supplying same amount carbohydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Soft Breads. (*Cont.*)						
	Rademann's Nährmitteljabrik, Frankfurt.						
1910	Diabetiker-Schwarzbrot (dry).....	29.1	14.5	2.5	45.8	10	283
1910	Diabetiker-Schwarzbrot (dry).....	33.6	14.9	1.9	....	11+	267
1910	Diabetiker-Weissbrot (dry).....	....	43.4	....	....	19	...
1910	Diabetiker-Weissbrot (dry).....	33.8	23.3	0.5	37.0	13	258
1910	"D-K Brot (dry).....	....	12.3	....	....	9	...
1892	Erdnuss-Brot.....	24.6	33.6	12.8	....	27	328
1910	Litonbrot.	42.6	30.2	2.5	17.5	25	230
1894	Schelte, Münster, Aleuronatbrot.....	38.8	18.3	0.6	....	13	239
	Seidl, München.						
1910	Aleuronatbrot.....	28.0	21.9	0.3	....	11	280
1910	Kleberbrot.....	24.2	18.6	0.7	....	10	298
1899	Troponwerke, Mülheim, Tropon-Brot..	42.1	19.5	....	....	?	...

	Hard Breads and Bakery Products						
	Bischof & Co., London.						
1907	Diabetic Gluten Bread	7.4	73.1	0.5	....	37	354
1907	Essential Bread for Super Alimentation	7.3	26.6	1.6	....	9	359
	Brusson Jeune, Villemur, France.						
1910	Gluten Bread	7.8	32.1	1.8	49.8	9	373
1912	Gluten Bread	12.7	37.3	1.8	40.1	11	354
	Callard, Stewart & Watt, London.						
1909	Almond Biscuit, Plain	3.7	28.3	28.0	....	14+	512
1909	Almond Shortbreads	4.2	19.5	52.1	....	26+	630
1906	Casoid Biscuits No. 1	7.8	63.0	17.3	8.1	66+	444
1909	Casoid Biscuits No. 1	7.2	64.8	16.8	....	61+	445
1913	Casoid Biscuits No. 1	4.8	66.8	18.8	4.0	91	460
1908	Casoid Biscuits No. 2	....	58.1	....	0.0	?	...
1909	Casoid Biscuits No. 2	7.5	57.8	25.5	....	95+	483
1908	Casoid Biscuits No. 3	....	54.7	....	Trace	?	...
1909	Casoid Biscuits No. 3	7.9	54.3	25.0	....	68+	473
1908	Casoid Dinner Rolls	....	80.8	....	3.3	?	...
1909	Casoid Dinner Rolls	7.0	78.0	11.1	....	252+	420
1909	Casoid Lunch Biscuit	4.2	25.5	44.9	....	25+	593
	Callard, Stewart & Watt, London.						
1909	Casoid Rusks	5.4	37.0	32.3	....	25+	522
1909	Cocoanut Biscuit+Saccharin	2.6	16.6	61.3	....	38+	684
1909	Ginger Biscuit+Saccharin	2.5	17.1	58.6	....	29+	668

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbo-hydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Hard Breads and Bakery Products. (*con.*)						
	Callard, Stewart & Watt, London.						
1909	Kalari Batons	8.1	52.9	33.7	....	589	519
1913	Kalari Batons	4.5	43.2	39.0	0	69	553
1909	Kalari Biscuit	6.3	56.9	31.4	....	312+	517
1909	Prolactic Biscuit	6.3	42.9	27.5	....	27+	496
1913	Charrasse Biscuits Croquettes au Gluten	7.3	34.3	5.4	30.6	10	395
1913	Charrasse Biscottes Lucullus	7.5	11.4	5.7	59.2	7	391
1913	Charrasse Gluten Exquis Biscuits aux Amandes	5.3	18.1	23.8	25.5	10	489
1913	Charrasse Gluten Fleur de Neige Pain	6.1	35.9	12.5	25.1	12	427
1913	Charrasse Mignonettes au Gluten	8.2	40.1	5.7	27.3	12	386
1913	Charrasse Pain de Gluten	8.1	40.8	5.3	27.2	12	385
1913	Charrasse Tranches Grillées pour Potage	7.7	40.6	3.6	28.8	12	377

	Frank & Co., Bockenheim,						
1892	Erdnuss-Kakes	6.4	32.2	19.1	....	15	447
	Fritz, Vienna.						
1910	Braunes Luftbrot "B"	....	42.6	....	....	27	...
1910	Mandelbrot	....	15.4	....	....	23	...
	Fromm & Co., Dresden.						
1913	Almond-form Wafers with Chocolate	2.6	4.8	29.0	14.0	8	529
1913	Butterbrezeln	6.3	12.3	16.5	43.1	8	449
1913	Crackers	7.4	12.9	7.7	58.2	8	395
1913	Eierbiscuit	7.7	18.8	11.4	37.5	9	420
1910	Eiweissbrot	....	45.5	....	....	14	...
1913	Hazelnuss-Stangen	5.2	13.4	16.0	0.0	9	441
1913	Luft Bread	8.3	50.9	1.0	23.4	17	335
1913	Makronen	6.0	14.1	19.4	0.0	9	456
1913	Salz-Stangen	6.2	13.0	15.6	39.1	9	437
1913	Stangenin	6.6	14.0	13.0	51.6	8	431
1910	Uni Bread	....	71.3	....	....	62	...
1913	Uni Bread	8.1	71.7	1.7	2.9	56	340
	Gericke, Potsdam.						
1910	Doppel-Porterzwieback	....	19.1	....	....	13	...
1910	Doppel-Porterzwieback	4.9	34.2	19.5	....	13+	471
1910	Mandelbrot	....	16.2	....	....	12	...
1910	Porterbiskuits	....	16.1	....	....	8	...
1910	Porterzwieback	....	26.4	....	....	7	...
1910	Sifarbiskuits	....	20.2	....	....	15	...

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbo-hydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Hard Breads and Bakery Products. (*con.*)						
	Groetzsch, Frankfurt.						
1910	Diabetiker-Salzbrezeln	14.0	36.3	29.3	....	31+	477
1910	Diabetiker-Salzbrezeln	5.3	34.5	35.4	....	23	548
1910	Pfeffernüsse	25.2	38.7	24.0	....	57+	408
1910	Pfeffernüsse	15.2	39.2	32.0	....	51	486
	Gumpert, Berlin.						
1910	Diabetiker-Stangen	5.5	31.1	49.5	....	48+	614
1910	Doppel-Diabetiker-Zwieback	4.6	32.5	32.1	27.1	19	529
	F. Günther, Frankfurt.						
1892	Aleuronat-Kakes	5.1	14.9	9.3	....	8	421
1892	Aleuronat-Kakes	4.5	17.8	7.9	....	8	412
1897	Aleuronat-Kakes	4.5	15.3	8.7	....	8+	420
	Health Food Co., New York.						
1913	Alpha Best Diabetic Wafer	4.9	66.1	13.6	Trace	47	432
1906	Diabetic Biscuit	4.7	28.1	9.0	51.1	10	413

1913	Diabetic Biscuit	8.9	25.0	9.2	46.5	10	400
1913	Gluten Nuggets	5.7	30.2	12.8	38.6	11	429
1906	Glutona	4.8	22.1	11.8	54.9	9	429
1906	Glutosac Butter Wafers	4.7	27.6	12.9	41.2	11	424
1906	Glutosac Rusks	4.5	36.5	3.8	42.5	10	387
1906	Glutosac Wafers, Plain	6.1	29.4	9.6	41.6	11	404
1906	Glutosac Zwieback	7.6	32.5	6.9	40.9	11	389
1906	No. 1 Proto Puffs	8.6	75.9	1.0	9.9	40	365
1913	No. 1 Proto Puffs	7.2	76.3	2.9	4.3	50	374
1911	No. 2 Proto Puffs	8.2	52.4	1.5	27.2	15	367
1913	No. 2 Proto Puffs	7.9	56.6	2.1	19.0	17	368
1906	Protosac Rusks	5.9	40.9	2.0	43.9	11	376
1913	Protosoy Diabetic Wafers	3.9	43.1	24.9	4.7	25	481
1906	Salvia Sticks	6.6	39.2	20.8	18.7	22	440
	Heintz Food Co., Chicago.						
1912	Gluten Biscuits	....	13.1	....	....	?	
1913	Gluten Biscuits	6.4	12.8	18.3	21.4	9	447
1913	Gluten Biscuits	7.3	14.5	7.2	45.5	8	391
	R. Hundhausen, Hamm.						
1892–6	Aleuronatzwieback, high gluten	8.5	66.2	5.0	....	30+	381
1892–6	Aleuronatzwieback, low gluten	6.5	22.9	8.6	....	9	407
1894	Aleuronat-Biskuits	6.6	24.8	11.2	....	10	409
1891	Aleuronat-Kakes	3.4	20.1	9.4	....	8	424
	Huntley & Palmer, London.						
1912	Akoll Biscuits	9.3	53.2	26.9	Trace	84	480
1913	Akoll Biscuits	7.2	54.5	27.4	Trace	78	492

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbo-hydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Hard Breads and Bakery Products. (*con.*)						
	Jireh Diabetic Food Co., New York.						
1906	Diabetic Biscuits	6.3	14.8	3.7	65.4	7	382
1906	Diabetic Biscuits	8.9	13.1	3.9	....	7	370
1906	Diabetic Rusks	8.7	14.6	5.0	....	8	374
1913	Diabetic Biscuits	5.4	13.2	7.4	49.6	7	403
1913	Diabetic Rusks	5.4	14.9	8.7	47.0	8	410
1906	Wheat Nuts	7.6	19.0	15.6	50.1	10	434
1906	Wheat Nuts	6.0	21.0	22.3	....	11	470
	Johnson Educator Food Co., Boston.						
1906	Almond Biscuits	5.3	29.0	8.8	50.0	10	412
1906	Diabetic Biscuits	5.9	25.3	7.5	54.9	9	405
1906	Educator Crackers, Greseni Gluten	6.2	23.0	4.6	57.9	8	386
1913	Educator Gluten Bread Sticks	8.4	35.9	7.2	37.5	12	392
1911	Gluten Cookies	4.8	26.4	16.0	37.8	11	449
1906	Gluten Rusk, Greseni Gluten	6.2	22.1	0.3	63.3	8	364
1906	Gluten Wafers	6.9	30.3	0.4	57.0	9	370

1906	Glutine, Greseni Gluten	6.4	21.9	0.8	63.1	8	366
1899	Glutine, Greseni Gluten	10.2	13.8	0.9	....	7+	359
	The Kellogg Food Co., Battle Creek.						
1912	Avena-Gluten Biscuit	7.9	21.4	12.7	41.1	10	422
1906	Potato Gluten Biscuit	8.2	80.0	0.4	9.8	50	366
1909	Potato Gluten Biscuit	7.6	75.6	2.6	....	40+	379
1913	Potato Gluten Biscuit	8.8	41.5	0.5	39.5	11	363
1906	Pure Gluten Biscuit	7.5	80.3	0.8	9.5	52	369
1909	Pure Gluten Biscuit	8.2	48.3	3.3	....	14+	379
1913	Taro-Gluten Biscuit	9.4	31.3	0.5	48.2	9	361
1906	40% Gluten Biscuit	7.5	35.8	1.0	52.6	10	368
1909	40% Gluten Biscuit	7.5	36.4	2.8	....	10+	378
1911	40% Gluten Biscuit	8.0	43.3	1.2	35.3	12	367
1912	40% Gluten Biscuit	10.2	47.5	0.5	35.0	13	359
1913	40% Gluten Biscuit	7.2	37.2	0.8	45.0	10	369
1912	80% Gluten Biscuit	10.1	82.4	0.9	4.7	118	355
1895	Kirche, Düsseldorf, Aleuronat-Kakes	5.0	17.0	13.7	....	9	439
	Klopfer Chemische Fabrik, Dresden.						
1910	Glidinebrot	12.7	47.6	2.2	32.8	15	350
	Eugene Loeb, New York.						
1913	Gluten Luft Bread	7.3	27.9	9.2	44.1	10	411
	Pure Gluten Food Co., New York.						
1913	Gum Gluten Biscuit Crisps	5.3	42.9	0.7	39.3	11	372

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbohydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Hard Breads and Bakery Products. (*con.*)						
	Rademann's Nährmittelfabrik, Frankfurt.						
1893	Diabetiker-Biskuits	2.9	44.1	29.8	10.0	27	523
1913	Diabetiker-Biskuits	5.0	29.6	19.6	25.9	12	473
1913	Diabetiker-Bretzel	6.8	31.4	8.5	40.7	11	...
1910	Diabetiker-Cakes	....	12.6	....	....	13	402
1913	Diabetiker-Cakes	6.5	29.6	13.5	39.1	11	429
1893	Diabetiker-Chokolade-Biskuits	1.8	44.9	27.6	11.8	24	516
1913	Diabetiker-Dessert-Gebäck	4.3	22.2	42.4	5.9	19	580
1910	Diabetiker-Makronen	....	12.3	....	....	47	...
1910	Diabetiker-Makronen	4.5	22.3	48.0	8.8	25	605
1913	Diabetiker-Makronen	4.0	23.2	48.0	3.0	26	607
1910	Diabetiker-Stangen	....	22.7	....	....	31	...
1910	Diabetiker-Stangen	10.5	29.8	33.0	....	22+	515
1913	Diabetiker-Stangen	4.5	17.7	44.2	21.4	18	586

	Rademann's Nährmittelfabrik Frankfurt						
1910	Diabetiker-Zwieback	....	16.4	....	....	14	...
1910	Diabetiker-Zwieback	9.4	25.2	11.9	47.0	10+	413
1893	Erdnuss-Biskuits	1.9	34.8	21.5	9.0	14	489
1910	Käsestangen	6.9	11.2	29.3	....	10+	511
1913	Käsestangen	6.7	9.3	33.7	38.0	11	524
1910	Sanitätszwieback	....	17.5	....	....	9	...
1897	Schelle, Braunschweig, Aleuronat-Kakes	4.9	19.9	10.8	....	8+	429
1910	Seidl, München, Kleberzwieback	6.3	14.8	7.8	....	8	396
	Roman Uhl, Karlsbad.						
1913	Carlsbad-Water Biscuits, "Sprudel" Brand	8.1	10.0	5.2	55.6	7	386
	G. Van Abbott & Sons, London,						
1913	Caraway Biscuits for Diabetics	6.7	35.6	37.5	8.6	33	544
1913	Diabetic Rusks for Diabetics	10.8	70.9	0.8	12.6	33	355
1913	Euthenia Biscuits	5.5	35.8	40.7	6.9	40	562
1913	Gluten Biscottes or Rolls	10.5	51.6	2.3	29.8	16	359
1913	Gluten Bread or slices	10.6	54.1	2.2	27.4	17	361
1913	Gluten Butter Biscuits for Diabetics	6.1	44.1	33.2	9.0	40	526
1913	Ginger Biscuits for Diabetics	4.1	34.6	39.4	10.9	32	560
1913	Midolia Biscuits	6.0	17.6	36.4	13.4	16	524
1913	Walnut Biscuits for Diabetics	4.4	20.9	57.2	Trace	41	648
	Breakfast Foods.						
	Brusson Jeune, Villemur, France.						
1913	Farine au Gluten	10.9	33.9	0.6	48.8	10	356

TABLE II.—ANALYSIS OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25). Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbohydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Breakfast Foods (*Cont.*)						
	Brusson Jeune, Villemur, France.						
1910	Gluten Semolina	9.7	17.2	0.5	64.9	7	360
	Farwellel & Rhine, Watertown, N. Y.,						
1913	Barley Crystals	9.9	11.5	1.3	62.7	7	359
1913	Cresco Grits	11.1	17.8	1.4	54.1	8	358
1908	Hazard's Wheat Protein Breakfast Food	8.5	40.1	1.0	....	13+	368
1913	Health Food Co., New York, Manana	10.2	37.6	1.9	31.0	11	355
	Jireh Diabetic Food Co., New York						
1913	Whole Wheat Farina	6.2	12.9	2.3	59.5	7	371
1913	Frumenty	6.2	12.3	1.7	65.4	7	374
	The Kellogg Food Co., Battle Creek.						
1911	Granola	6.1	13.9	0.8	45.2	7	368
	Pure Gluten Food Co., New York						
1904	Gum Gluten Breakfast Food	9.5	54.4	0.8	30.4	16	360
1906	Gum Gluten Breakfast Food	9.1	53.4	1.6	31.0	15	366

1911	Gum Gluten Breakfast Food.....	7.5	37.8	1.3	37.9	10	370
1911	Gum Gluten Granules.....	7.5	45.5	1.6	32.3	12	371
1901	Pure Gluten Breakfast Cereal.....	9.3	43.7	1.6	....	12	367
	Macaroni, Noodles, etc.						
	Brusson Jeune, Villemur, France.						
1910	Pâtes aux Oeufs Macaroni.....	8.8	13.9	0.4	69.2	7	364
1910	Pâtes aux Oeufs Nouillettes.....	8.7	14.4	0.5	68.9	7	365
1913	Petites Pâtes au Gluten.....	9.0	18.6	1.0	61.2	8	365
1910	Vermicelle au Gluten.....	8.0	18.4	0.4	65.8	7	367
	Jireh Diabetic Food Co., New York,,						
1913	Macaroni.....	8.8	16.9	0.9	58.8	7	361
	Eugene Loeb, New York.						
1913	Home Made Noodles.....	9.8	41.8	5.5	36.7	13	384
	Pure Gluten Food Co., New York,						
1906	Gum Gluten Macaroni.....	10.3	41.4	1.0	46.2	11	360
1911	Gum Gluten Noodles.....	8.3	36.6	2.4	42.0	10	374
	The Marvelli Co., Detroit, Mich.						
1901	Macaroni.....	13.4	20.7	0.6	....	8+	347
1912	Spaghetti.....	....	15.5	....	....	....	....
	Peanut Butter.						
1899	Atlantic Peanut Refinery, Philadelphia.	2.1	28.7	46.4	6.2	32	598
	J. W. Beardsley's Sons, New York,						
1913	Acme Red Brand.....	2.2	28.2	48.3	4.0	35	608
	Beech-Nut Packing Co., Canajoharie.						
1913	Peanut Butter.....	2.0	29.4	46.6	4.5	32	613

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbohydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Peanut Butter (*Cont.*)						
	A. C. Blenner & Co., New Haven (Distributed by)						
1913	Peanut Butter	2.9	29.7	47.9	4.6	37	607
	D. W. Brooke, Newark, N. J.						
1913	Peanut Butter	1.8	29.5	48.5	4.3	36	614
	Dillon & Douglass, New Haven, (Distributed by), Perfection						
1913		1.8	29.1	42.8	4.8	26	582
	H. J. Heinz Co., Pittsburgh, Pa.						
1913	Peanut Butter	3.0	28.9	47.3	4.0	35	592
	The Kellogg Food Co., Battle Creek.						
1913	Peanut Butter	3.6	30.6	48.8	3.2	43	610
1913	Peanut Butter	3.1	28.1	49.7	3.4	36	619
	Francis H. Leggett & Co., New York.						
1913	Premier	2.1	29.7	43.7	6.5	28	587
	MacLaren Imperial Cheese Co., Detroit.						
1913	Eagle	1.5	32.1	44.9	4.3	33	597

1913	Nut Products Co., New Haven, Peanolia	2.4	27.9	51.3	3.9	41	625
	Peanolia Food Co., New Haven.						
1899	Peanolia	2.0	29.9	46.7	5.6	40	593
1913	S. S. Pierce Co., Boston, Acharis Brand	1.7	28.7	48.3	5.1	19	608
	Average	*2.3*	*29.3*	*47.2*	*4.6*	*34*	*604*
	Almond Paste.						
	Chapman, Chicago.						
1902–3	Almond Paste	23.7	13.1	25.5	11.3	15+	427
	Henry Heide, New York.						
1902–3	Almond Paste	22.0	12.7	20.0	small	12+	406
	Spencer, New York.				very		
1902–3	Almond Paste	27.0	13.5	26.2	small	17+	416
	Average	*24.2*	*13.1*	*23.9*	....	*15+*	*416*
	Nuts.						
	California Paper Shell Almonds, edible portion (Sold by Chas. Lawrence Co.,						
1913	Boston)	3.5	18.4	55.3	0	33	637
	Jireh Diabetic Food Co., New York,						
1913	Diatetic Pine Nuts (Pignolas)	2.0	39.7	49.4	0	156	617
	The Kellogg Food Co., Battle Creek.						
1913	Pine Nuts	2.6	38.0	49.6	....	126	615
	Malted Nuts.						
	The Kellogg Food Co., Battle Creek.						
1901	Malted Nuts	2.6	23.7	27.6	....	12+	519

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Continued*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbohydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Malted Nuts. (*Cont.*)						
	Nashville Sanitarium-Food Co., Nashville, Tenn.						
1913	Malted Nut Food	3.4	24.7	42.7	3.4	19	593
	Other Nut Preparations.						
	The Kellogg Food Co., Battle Creek.						
1906	Almond Butter (Sanitas)	0.9	22.6	61.5	3.7	65	677
1908	Almond Butter (Sanitas)	2.3	21.7	61.5	....	46+	686
1913	Nut Bromose (Meltose and Nuts)	14.0	17.1	26.8	3.2	13	467
1906	Nut Butter (Sanitas)	0.2	28.8	50.5	9.1	38	625
1906	Nut Meal (Sanitas)	3.0	29.0	51.7	8.9	44	630
1906	Nuttolene	55.2	12.7	21.8	....	84	272
1906	Protose (Sanitas)	62.2	22.6	9.2	....	147	188
	Nashville Sanitarium-Food Co., Nashville, Tenn.						
1913	Nut Butter	1.9	28.0	52.6	3.8	41	637

1913	Nutcysa	57.0	12.9	21.0	Trace	84	266
1913	Nutfoda	62.3	20.8	8.0	Trace	78	182
	Chocolate.						
	Brusson Jeune, Villemur, France.						
1913	Chocolat with Gluten á la Vanille	2.6	15.9	49.7	9.2	20	617
	Fromm & Co., Dresden.						
1913	Conglutin-Diabetiker-Schokolade	4.0	17.6	39.1	4.3	16	553
	Groetzsch, Frankfurt,						
1910	Essschokolade (Orange)	4.6	10.8	60.7	12.0	31	658
1910	Kochschokolade	10.9	25.3	25.1	15.9	20	432
	Plasmon Co., London.						
1901	Plasmon Chocolate	....	21.1	....	....	?	...
1903	Plasmon Chocolate	3.5	20.2	25.1	Trace	11	499
	Rademann's Nährmittelfabrik, Frankfurt						
1910	Diabetiker-Chokolade	....	16.1	....	....	55	...
1913	Diabetiker-Chokolade	2.5	17.5	57.6	3.8	31	656
	Troponwerke Mülheim,						
1898	Tropon-Chokolade	1.7	18.2	25.9	....	11	506
1899	Tropon-Chokolade	1.8	18.4	....	....	?	...
	Cocoa.						
1913	Charrasse Gluto Cacao	6.4	21.5	22.2	16.3	13	446
	Jireh Diabetic Food Co., New York.						
1906	Diabetic Cocoa	3.1	20.6	17.8	32.6	10	445
1906	Diabetic Cocoa	7.3	19.1	18.4	29.0	11	434
1903	Plasmon Co., London, Plasmon Cocoa	8.9	52.8	10.8	5.1	25+	392

TABLE II.—ANALYSES OF DIABETIC FOODS.—*Concluded*

Date of Analysis	Manufacturer and Brand	Water, Per Cent.	Protein (N×6.25), Per Cent.	Fat (Ether Extract), Per Cent.	Starch, Per Cent.	Weight in grams supplying same amount carbohydrates as 10 gms. wheat bread.	Calculated Calories per 100 gms.
	Cocoa. (*Cont.*)						
	Rademann's Nährmittelfabrik, Frankfurt						
1913	Diabetiker-Cacao	5.2	17.6	23.6	10.7	12	462
	Callard, Stewart & Watt, London.						
1913	Casoid Chocolate Almonds	3.5	22.3	51.8	Trace	33	620
	Miscellaneous Products.						
	Gustav Muller & Co., New York.						
1913	Dr. Bouma Sugar-Free Fat-Milk	91.8	2.4	5.3	....	....	57
	Rose.						
1900	Diabetesmilch 5 per cent	92.5	1.1	5.0	....	442	54
1900	Diabetesmilch 10 per cent	86.3	2.3	10.0	....	442	104
	D. Whiting & Sons, Boston.						
1913	Sugar-Free Milk (ave. 3 analyses)	86.4	5.7	7.2	....	....	88
1913	Health Food Co., New York, Kaffeebrod	4.5	12.9	1.5	10.1	7	355
	The Kellogg Food Co., Battle Creek.						
1911	Sanitas Meltose	26.8	0.6	....	....	7	291

GLUTEN FLOUR

Gluten Flours	Protein	Carbohydrates
Barker's Gluten Food "A" ('06)	85	4
Barker's Gluten Food "A" ('12)	87	5
Bischof's Gluten Flour	80	5
Barker's Gluten Food "B" ('06)	84	5
Barker's Gluten Food "B" ('13)	85	7
Barker's Gluten Food "C" ('06)	83	7
Kellogg's 80% Gluten ('12)	81	8
Barker's Gluten Food "C" ('13)	84	9
Metcalf's Vegetable Gluten ('13)	80	10
Health Food Pure Washed Gluten ('13)	80	11
Loeb's Imported Gluten Flour	76	12
Van Abbott's Gluten Flour	75	13
Kellogg's 80% Gluten ('09)	79	13
Metcalf's Vegetable Gluten ('06)	61	28
Health Food Pure Washed Gluten ('06)	62	30
Van Abbott's Gluten Semola	51	32
Pure Gl. Food Co. Plain Gluten Flour	54	35
Pure Gl. Food Co. Gum Gluten Ground ('06)	50	40
Richelieu Gluten Flour	50	40
Gilman's Gluten Flour	47	40
Kellogg's 40% Gluten Fl. ('12)	47	41
Pure Gl. Food Co. Gum Gluten Ground ('04)	44	43
Loeb and Co.'s Gluten Flour	44	44
Farwell and Rhines' Glut. Fl. ('13)	45	45
Pure Gl. Food Co. Gum Gluten Self-Rais. ('06)	38	45
Kellogg's 40% Gluten Fl. ('13)	44	46
Loeb's Pure Gluten Flour	40	46
Protosac Gluten Flour ('13)	43	46
Pieser-Livingston Gluten Flour	43	47
Pronireu	37	47
Kellogg's 40% Gluten Fl. ('06)	40	47
Glutosac Gluten Flour ('13)	40	48
Martindale's Gluten Flour	40	49

GLUTEN FLOUR.—*Continued*

Gluten Flours	Protein	Carbohydrates
Kellogg's 40% Gluten Fl. ('09)	39	50
Kellogg's 40% Gluten Fl. ('06)	38	50
Kellogg's 40% Self-Raising	39	50
Educator Gluten Flour ('11)	40	50
Pure Gl. Food Co. Gum Gluten Fl.	38	51
Protosac Gluten Flour ('06)	37	51
Glutosac Gluten Flour ('06)	34	52
Pure Gl. Food Co. Gum Gluten, Self-Rais. ('01)	32	53
Loeb's Gluten Cracker Meal	28	54
Hoyt's Gum Gluten ('06)	32	54
Glutosac Gluten Flour ('09)	35	55
Jireh Protein Flour	31	57
Pure Gl. Food Co. Gum Gluten Ground ('02)	27	59
Educator Gluten Flour ('06)	26	59
Kellogg's 20% Gluten Meal ('12)	28	61
Wilson's Gluten Fl., Self-Raising	17	64
Wilson's Gluten Flour	21	65
Kellogg's 20% Gluten Meal ('09)	21	68
Ralston Gluten Flour ('95)	15	69
Ralston Gluten Flour ('02)	16	71
Kellogg's 26% Gluten Meal ('04)	16	72
Farwell and Rhines' Gluten Flour ('06)	11	74
Farwell and Rhines' Gluten Flour ('09)	12	76

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS

Food Materials	Water	Protein	Fat	Total Carbohydrate	Calorie Value per 100 gms.
Beef—cooked					
Stewed beef	23.2	21.4	51.7	.....	575
Roast	48.2	22.3	28.6	.....	360
Round steak—fat removed	63.0	27.6	7.7	.....	186
Loin steak—tenderloin, edible portion	54.8	23.5	20.4	.....	218
Beef—canned					
Corned beef	51.8	26.3	18.7	.....	284
Dried beef	44.8	39.2	5.4	.....	213
Roast beef	58.9	25.9	14.8	.....	245
Tongue, whole	51.3	19.5	23.2	.....	300
Corned and pickled, all analysis	53.6	15.6	26.2	.....	310
Tongue, pickled	62.3	12.8	20.5	.....	245
Beef—dried, salted and smoked	54.3	30.0	6.5	(3)0.4	186
Veal—fresh					
Breast—veal—all analysis	68.2	20.3	11.0	.....	186
Chuck—veal—all analysis	73.8	19.7	5.8	.....	135
Leg—veal—all analysis	71.7	20.7	6.7	.....	148
Lamb—cooked					
Chops, broiled	47.6	21.7	29.9	.....	370
Mutton—cooked					
Leg—roast	50.9	25.0	22.6	.....	315
Mutton—canned					
Corned	45.8	28.8	22.8	.....	335
Tongue	47.6	24.4	24.0	.....	330
Pork—pickled—salted and smoked					
Ham—smoked—lean	53.5	19.8	20.8	.....	276
Ham—smoked—all analysis	39.8	16.5	38.8	.....	432
Bacon—all analysis	20.2	10.5	64.8	.....	651

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS.—*Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Sausage					
Arles	17.2	26.8	50.6	.....	583
Banquet (carbohydrate 0.0–0.2)	62.7	18.3	15.7	.....	223
Bologna	60.0	18.7	17.6	0.3	243
Farmer	23.2	29.0	42.0	.....	531
Frankfort (2.4–8.6)	57.2	19.6	18.6	3.4	260
Lyons—pure ham	32.5	32.3	27.2	.....	388
Pork (0.0–8.6)	39.8	13.0	44.2	1.1	472
Salami	30.5	24.1	39.9	.....	473
Poultry and Game—Fresh					
Chicken—broilers	74.8	21.5	2.5	.....	112
Fowls	67.3	19.3	16.3	.....	232
Goose—young	46.7	16.3	36.2	.....	406
Turkey	55.5	21.1	22.9	.....	302
Chicken liver	69.3	22.4	44.2	2.4	142
Goose liver	62.6	16.6	15.9	3.7	233
Turkey liver	69.6	22.9	5.2	0.6	145
Poultry and Game—Cooked					
Capon	59.9	27.0	11.5	.....	218
Chicken—fricasseed	67.5	17.6	11.5	2.4	190
Turkey—roast	52.0	27.8	18.4	.....	288
Fish—Fresh					
Bass—black—whole	76.7	20.6	1.7	.....	101
Bass—sea—whole	79.3	19.8	0.5	.....	87
Perch—yellow	79.3	18.7	0.8	.....	84
Trout—brook—whole	77.8	19.2	2.1	.....	98
Cod—whole	82.6	16.5	0.1	.....	72
Salmon	64.6	22.0	12.8	.....	211
Flounder—whole	84.2	14.2	0.6	.....	64

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS.—*Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Haddock—entrails removed..	81.7	17.2	0.3	.....	74
Halibut—steaks or sections...	75.4	18.6	5.2	.....	125
Shad—whole.....	70.6	18.8	9.5	.....	166
Fish—Preserved and Canned					
Cod—salt—edible portion....	53.5	25.4	0.3	.....	91
Haddock—smoked.....	72.5	23.3	0.2	.....	97
Halibut—smoked.....	49.4	20.7	15.0	.....	226
Herring—smoked.....	34.6	36.9	15.8	.....	301
Mackerel—salt—entrails removed.....	42.2	21.1	22.6	.....	298
Salmon—canned.....	63.5	21.8	12.1	.....	235
Sardines—canned.....	52.3	23.0	19.7	.....	280
Sturgeon—caviare.....	38.1	30.0	19.7	.....	340
Shell-fish					
Clams—long—in shell.....	85.8	8.6	1.0	2.0	53
Crabs—hard shell—whole....	77.1	16.6	2.0	1.2	91
Lobster—whole.....	79.2	16.4	1.8	0.4	87
Oysters—shell.....	86.9	6.2	1.2	3.7	52
Scallops.....	80.3	14.8	0.1	3.4	76
Terrapin.....	74.5	21.2	3.5	.....	121
Turtle—green—whole.....	79.8	19.8	0.5	.....	87
Eggs					
Hens—uncooked—edible portion.....	73.7	13.4	10.5	.....	160
Hens—boiled—edible portion.	73.2	13.2	12.0	.....	170
Hens—boiled whites.....	86.2	12.3	0.2	.....	55
Hens—boiled yolks.....	49.5	15.7	33.3	.....	390
Dairy Products, Etc.					
Butter—as purchased (*a*).....	11.0	1.0	85.0	.....	800
Butter milk—as purchased...	91.0	3.0	0.5	4.8	36

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIAL.—*Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Calorie Value per 100 gms.
Cheese—American pale (*b*)...	31.6	28.0	35.9	0.3	456
Cheese—American red (*c*)....	28.6	....	38.3	....	481
Cheese—cottage.....	72.0	20.9	1.0	4.3	113
Cheese—full cream (*d*).....	34.2	25.9	33.7	2.4	433
Cheese—Limburger (*e*).....	42.1	23.0	29.4	0.4	372
Cheese—Roquefort (*f*).....	39.3	22.6	29.5	1.8	377
Cheese—Neuchatel (*g*).....	50.0	18.7	27.4	1.5	340
Cheese—Fromage de Brie (*h*).	60.2	15.9	21.0	1.4	268
Cheese—Swiss (*i*).....	31.4	27.6	34.9	1.3	446
Koumiss.....	89.3	21.8	2.1	5.4	53
Milk—condensed—sweetened	26.9	8.8	8.3	54.1	337
Milk—condensed—unsweetened (evaporated).....	68.2	3.4	9.3	11.2	175
Milk—skimmed.....	90.5	9.6	0.3	5.1	37
Milk—whole.....	87.0	3.3	4.0	5.0	72
Whey.....	93.0	1.0	0.3	5.0	27

(*b*) Contained 0.82 per cent. common salt.

(*c*) Contained 0.72 per cent. common salt.

(*d*) The content varied with the age of the cheese. The average of 148 analyses of green cheese in which the carbohydrate and ash were determined by difference gives water 33, protein 28.6, fat 33.7, carbohydrate and ash 4.7 per cent.

(*e*) Contained 3.7 per cent. common salt.

(*f*) Contained 5.3 per cent. common salt.

(*g*) Contained 1.4 per cent. common salt.

(*h*) Contained 0.4 per cent. common salt.

(*i*) Contained 1.9 per cent. common salt.

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS.—*Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Miscellaneous					
Gelatine—as purchased	13.6	91.4	0.1	.....	378
Calf's foot jelly	77.6	4.3	.....	17.4	90
Lard—refined	....	....	100.0	.....	937
Lard—unrefined	4.8	2.2	94.0	.....	865
Oleomargarine	9.5	1.2	83.0	.....	783
Flours, Meals, Etc.					
Barley—meal and flour	11.9	10.5	2.2	72.8	364
Barley—pearled	11.5	8.5	1.1	77.8	377
Buckwheat flour	13.6	6.4	1.2	77.9	360
Corn meal—unbolted	11.6	8.4	4.7	74.0	384
Hominy	11.8	8.3	0.6	79.0	377
Hominy—cooked	79.3	2.2	0.2	17.8	84
Oatmeal	7.3	16.1	7.2	67.5	413
Oatmeal—gruel	91.6	1.2	0.4	6.3	34
Oatmeal—all analysis	7.8	16.5	7.3	66.5	411
Rice	12.3	8.0	0.3	79.0	362
Rice flour	8.5	8.6	6.1	68.0	273
Rye flour	12.9	6.8	0.9	78.7	362
Wheat flour—California fine	13.8	7.9	1.4	76.4	360
Wheat flour—Entire wheat	11.4	13.8	1.9	7.9	372
Wheat flour—gluten	12.0	14.2	1.8	71.1	370
Wheat flour—Pat. roller process—Average all analysis of high and medium grades and grades not indicated	12.0	11.4	1.0	75.1	366
Wheat Preparations—Breakfast Foods					
Farina	10.9	11.0	1.4	76.3	374
Shredded	8.1	10.5	1.4	77.9	377

Chemical Composition of American Food Materials.— *Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Macaroni	10.3	13.4	0.9	74.1	370
Macaroni—cooked	78.4	3.0	1.5	15.8	92
Noodles	10.7	11.7	1.0	75.6	370
Spaghetti	10.6	12.1	0.4	76.3	368
Vermicelli	11.0	10.9	2.0	72.0	361
Breads, Pastry, Etc.					
Bread—brown	43.6	5.4	1.8	47.1	233
Bread—corn (Johnny cake)	38.9	7.9	4.7	46.3	267
Bread—rye	35.7	9.0	0.6	53.2	262
Bread—rye—black	36.9	9.6	0.6	48.9	247
Bread—rye—whole	50.7	11.9	0.6	35.9	203
Bread—wheat	29.0	6.3	6.5	57.3	323
Buns—hot cross	36.7	7.9	4.8	49.7	283
Buns—sugar	29.6	8.1	6.9	54.2	322
Buns—gluten	38.2	9.3	1.4	49.8	257
Buns—graham	35.7	8.9	1.8	52.1	268
Biscuit—home made	32.9	8.7	2.6	55.3	288
Rolls—French	32.0	8.5	2.5	55.7	288
Rolls—plain	25.2	9.7	4.2	59.9	326
Rolls—water	32.6	9.0	3.0	54.2	288
Rolls—all analyses	29.2	8.9	4.1	56.7	310
Rolls—toasted	24.0	11.5	1.6	61.2	317
Rolls—white home-made	35.0	9.1	1.6	53.3	272
Rolls—white Vienna	34.2	9.4	1.2	54.1	273
Rolls—white—all analyses	35.3	9.2	1.3	53.1	270
Rolls—whole wheat	38.4	9.7	0.9	49.7	253
Zwieback	5.8	9.8	9.9	73.5	437
Crackers					
Graham	5.4	10.0	9.4	73.8	434

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS.—*Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Oatmeal	6.3	11.8	11.1	69.0	437
Oyster	4.8	11.3	10.5	70.5	437
Saltines	5.6	10.6	12.7	68.5	445
Soda	5.9	9.8	9.1	73.1	427
Water	6.4	11.7	5.1	75.7	407
All analyses	6.8	10.7	8.8	71.9	423
Cake					
Baker's cake as purchased	31.4	6.3	4.6	56.9	304
Chocolate layer cake	20.5	6.2	8.1	64.1	366
Coffee cake	21.3	7.1	7.5	63.2	361
Cup cake	15.6	5.9	9.0	68.5	392
Fruit cake	17.3	5.9	10.9	64.1	391
Sponge cake	15.3	6.3	10.7	65.9	398
All analyses except fruit	19.9	6.3	9.0	63.3	372
Cookies					
All analyses as purchased	8.1	7.0	9.7	73.7	424
Ginger snaps	6.3	6.5	8.6	76.0	421
Lady fingers	15.0	8.8	50.0	70.6	374
Macaroons	12.3	62.5	15.2	65.2	438
Doughnuts	18.3	6.7	21.0	53.1	444
Jumbles	14.3	7.4	13.5	63.7	442
Pie					
Apple	42.5	3.1	9.8	42.8	282
Cream	32.0	4.4	11.4	51.2	336
Custard	62.4	4.2	6.3	26.1	184
Lemon	47.4	3.6	10.1	37.4	264
Mince	41.3	5.8	12.3	38.1	296
Pudding—Indian meal	60.7	3.5	4.8	27.5	181
Pudding—rice custard	59.4	4.0	4.6	31.4	183

Chemical Composition of American Food Materials.— *Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Pudding—tapioca	64.5	3.3	3.2	28.2	160
Sugar—coffee or brown	....	....	....	95.0	392
Sugar—granulated	....	....	....	100.0	413
Sugar—maple	....	....	....	82.0	342
Sugar—powdered	....	....	....	100.0	415
Syrup—maple	....	....	....	71.4	295
Vegetables					
Artichokes	79.5	2.6	0.2	16.7	81
Asparagus	94.0	1.8	0.2	3.3	21
Beans—butter	58.9	9.4	0.6	29.1	16
Beans—frijoles	7.5	21.9	1.3	65.1	372
Beans—lima—fresh	68.5	7.1	0.7	22.0	361
Beans—string—fresh	89.2	2.3	0.3	7.4	43
Beets—fresh	87.5	1.6	0.1	9.7	47
Cabbage	91.5	1.6	0.3	5.6	32
Cabbage—curly	87.3	4.1	0.6	6.2	47
Cabbage—sprouts	88.2	4.7	1.1	4.3	47
Carrots—fresh	88.2	1.1	0.4	9.3	46
Cauliflower	92.3	1.8	0.5	4.7	31
Celery	94.5	1.1	0.1	3.3	18
Green corn	75.4	3.1	1.1	19.7	117
Cucumbers	95.4	0.8	0.2	3.1	17
Egg plant	92.9	1.2	0.3	5.1	28
Greens, dandelion	81.4	2.4	1.0	10.6	63
Greens, beet—cooked	89.5	2.2	3.4	3.2	58
Kohl-rabi	91.1	2.0	0.1	5.5	32
Leeks	78.0	11.0	0.4	5.8	33
Lettuce	94.7	1.2	0.3	2.9	20
Mushrooms	88.1	3.5	0.4	6.8	46

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS.—*Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Okra	90.2	1.6	0.2	7.4	38
Onions—fresh	87.6	1.6	0.3	9.9	50
Onions—green (New Mexico)	87.1	1.0	0.1	11.2	51
Parsnips	83.0	1.6	0.5	62.0	66
Peas—green	74.6	7.0	0.5	16.9	136
Potatoes—raw or fresh	78.3	2.2	0.1	18.4	85
Potatoes—cooked—boiled	75.5	2.5	0.1	20.9	97
Potatoes—cooked—chips	2.2	6.8	39.8	46.7	594
Potatoes—cooked—mashed	75.1	2.6	3.0	17.8	112
Potatoes—sweet—raw	69.0	1.8	0.7	27.4	126
Potatoes—sweet—cooked	51.9	3.0	2.1	42.1	205
Pumpkins	93.1	1.0	0.1	5.2	27
Radishes	91.8	1.3	0.1	5.8	30
Rhubarb	94.4	0.6	0.7	3.6	23
Sauerkraut—as purchased	88.8	1.7	0.5	3.8	27
Spinach	92.3	2.1	0.3	3.2	24
Squash	88.3	1.4	0.5	9.0	47
Tomatoes	94.3	0.9	0.4	3.9	23
Turnips	89.6	1.3	0.2	8.1	41
Vegetables—Canned					
Artichokes	92.5	0.8	....	5.0	26
Asparagus	94.4	1.5	0.1	2.8	18
Beans—baked	68.9	6.9	2.5	19.6	132
Beans—string	93.7	1.1	0.1	3.8	21
Beans—wax	94.6	1.0	0.1	3.1	17
Beans—lima	79.5	4.0	0.3	14.6	80
Brussels sprouts	93.7	1.5	0.1	3.4	21
Corn—green	76.1	2.8	1.2	19.0	102
Okra	94.4	0.7	0.1	3.6	18
Peas—green	85.3	3.6	0.2	9.8	56

Chemical Composition of American Food Materials.— *Continued*

Food Material	Water	Protein	Fat	Total Carbohydrates	Calorie Value per 100 gms.
Potatoes—sweet	55.2	1.9	0.4	41.4	182
Pumpkins	91.6	0.8	0.2	6.7	32
Squash	87.6	0.9	0.5	10.5	52
Succotash	75.9	3.6	1.0	18.6	102
Tomatoes	94.0	1.2	0.2	4.0	23
Pickles—Condiments, Etc.					
Catsup—tomato	82.8	1.5	0.2	12.3	58
Horse-radish	86.4	1.4	0.2	10.5	52
Olives—green	58.0	1.1	27.6	11.6	322
Olives—ripe	64.7	1.7	25.9	4.3	267
Pickles—cucumber	92.9	0.5	0.3	2.7	15
Pickles—mixed	93.8	1.1	0.4	4.0	22
Pickles—spiced	77.1	0.4	0.1	20.7	87
Fruits, Berries, Etc.					
Apples	84.6	0.4	0.5	14.2	66
Apricots	85.0	1.1	...	13.4	60
Bananas—yellow	75.3	1.3	0.6	22.0	102
Blackberries	86.3	1.3	1.0	10.9	60
Cherries	80.9	1.0	0.8	16.7	81
Cranberries	88.9	1.4	0.6	9.9	47
Currants	85.0	1.5	...	12.8	58
Figs	79.1	1.5	...	18.8	84
Grapes	77.4	1.3	1.6	19.2	100
Huckleberries	81.9	0.6	0.6	16.6	76
Lemons	89.3	1.0	0.7	8.5	45
Muskmelons	89.5	0.6	...	9.3	41
Oranges	86.9	0.8	0.2	11.6	52
Peaches	89.4	0.7	0.1	9.4	42
Pears	84.4	0.6	0.5	14.1	65

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS.—*Continued*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Pineapple	89.3	0.4	0.3	9.7	44
Plums	78.4	1.0	...	20.1	87
Prunes	79.6	0.9	...	18.9	82
Raspberries—red	85.8	1.0	...	12.6	56
Raspberries—black	84.1	1.7	1.0	12.6	68
Strawberries	90.4	1.0	0.6	7.4	40
Watermelons	92.4	0.4	0.2	6.7	32
Fruits, Etc.—Dried					
Apples	28.1	1.6	2.2	66.1	300
Apricots	29.4	4.7	1.0	62.5	286
Currants—Zante	17.2	2.4	1.7	74.2	332
Dates	15.4	2.1	2.8	78.4	358
Figs	18.8	4.3	0.3	74.2	327
Grapes—ground	34.8	2.8	0.6	60.5	267
Prunes	22.3	2.1	...	73.3	363
Raisins	14.6	2.6	3.3	76.1	356
Raspberries	8.1	7.3	1.8	80.2	378
Fruits, Etc.—Canned; and Jellies, Preserves, etc.					
Apple—crab	42.4	0.3	2.4	54.4	248
Apple—sauce	61.1	0.2	0.8	37.2	162
Apricots	81.4	0.9	...	17.3	775
Apricots—sauce	40.0	1.9	1.3	48.8	222
Blackberries	40.0	0.8	2.1	56.4	255
Blueberries	85.6	0.6	0.6	12.8	61
Cherries	77.2	1.1	0.1	21.1	92
Cherry—jelly	21.0	1.1	...	77.2	323
Figs—stewed	56.5	1.2	0.3	40.9	174
Grape butter	36.7	1.2	0.1	58.5	237
Marmalade (orange)	14.5	0.6	0.1	84.5	352

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS.—*Continued*

Food Material	Water	Protein	Fat	Total Carbohydrates	Caloric Value per 100 gms.
Peaches	88.1	0.7	0.1	10.8	48
Pears	81.1	0.3	0.3	18.0	78
Pineapples	61.8	0.4	0.7	36.4	158
Prune sauce	76.6	0.5	0.1	22.3	95
Strawberries—stewed	74.8	0.7	...	24.0	102
Nuts					
Almonds	4.8	21.0	54.9	17.3	673
Beechnuts	4.0	21.9	57.4	13.2	660
Brazil nuts	5.3	17.0	66.8	7.0	725
Butternuts	4.4	27.9	61.2	35.0	703
Chestnuts	45.0	6.2	5.4	42.1	250
Cocoanuts	14.1	5.7	50.6	27.9	613
Filberts	3.7	15.6	63.3	13.0	751
Hickory nuts	3.7	15.4	67.4	11.4	743
Peanuts	9.2	25.8	38.6	24.4	568
Pecans	3.0	11.0	71.2	13.3	767
Pistachios	4.2	22.3	54.0	16.3	665
Walnuts—California Black	2.5	27.6	56.3	11.9	690
Walnuts—California Soft shell	2.5	16.6	63.4	16.1	730
Soups—Canned					
Asparagus—cream	87.4	2.5	3.2	5.5	63
Bouillon	96.6	2.2	0.1	0.2	11
Celery—cream	88.6	2.1	2.8	5.0	55
Chicken gumbo	89.2	3.8	0.9	4.7	43
Chicken soup	93.8	3.6	0.1	1.5	22
Consomme	96.0	2.5	...	0.4	12
Cream corn	86.8	2.5	1.9	7.8	60
Mock turtle					
Mulligatawny	89.3	3.7	0.1	5.7	60

CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS.—*Concluded*

Food Material	Water	Protein	Fat	Total Carbohydrate	Caloric Value per 100 gms.
Oxtail	88.8	4.0	1.3	4.3	46
Pea soup	86.9	3.6	0.7	7.6	52
Tomato soup	90.0	1.8	1.1	5.6	41
Turtle—green	86.6	6.1	1.9	3.9	58
Vegetable	95.7	2.9	...	0.5	15
Soups—Home-made					
Beef soup	92.9	4.4	0.4	1.1	26
Bean soup	84.3	3.2	1.4	9.4	65
Chicken soup	84.3	10.5	0.8	2.4	61
Clam chowder	88.7	1.8	0.8	6.7	43
Meat stew	84.5	4.6	4.3	5.5	82
Miscellaneous					
Chocolate	5.9	12.9	48.7	30.3	635
Cocoa	4.6	21.6	28.9	37.7	515
Cereal coffee infusion (1 part boiled in 20 parts water)	98.2	0.2	...	1.4	6
Yeast—compressed	65.1	11.7	0.4	21.0	138

Wines and Other Beverages	Gms. reducing sugars per 100 c.c.	Volume in liters supplying same amount of carbohydrates as 10 gms. wheat bread
Dry Wines		
California, red, Bordeaux or Claret.....(range 0.04– 0.63)	0.16	3.31 (13.25–0.84)
California, red, Burgundy.....(range 0.03– 0.42)	0.15	3.53 (17.67–1.26)
Zinfandel.....(range 0.03– 0.35)	0.15	3.53 (17.67–1.51)
California, white, Rhine.....(range 0.06– 0.63)	0.15	3.53 (8.83–0.84)
Burgundy.....(range 0.10– 0.45)	0.23	2.31 (5.30–1.18)
Sauterne.....(range 0.07– 3.57)	0.64	0.83 (7.57–0.15)
French, red.....(range 0.11– 0.84)	0.23	2.31 (4.82–0.63)
French, white....(range 0.65– 1.02)	0.84	0.63 (0.82–0.52)
German, white...(range 0.09– 1.96)	0.20	2.65 (5.89–0.27)
Hungarian, white (range 0.04– 0.86)	0.25	2.12 (13.25–0.62)
Italian, red.....(range 0.02– 2.70)	0.16	3.31 (26.50–0.20)
Italian, white....(range 0.02– 2.15)	0.19	2.79 (26.50–0.25)
North Carolina..(range 0.08– 1.75)	0.49	1.08 (6.63–0.30)
Ohio.....(range 0.07– 1.54)	0.31	1.71 (7.57–0.35)
Portugese, red...(range 0.01– 1.21)	0.16	3.31 (53.00–0.44)
Portugese, white.(range 0.10– 1.19)	0.32	1.63 (5.30–0.45)
Rhine, red.....(range 0.06– 0.27)	0.13	4.08 (8.83–1.96)
Rhine, white.....(range 0.02– 1.02)	0.18	2.94 (26.50–0.52)
Spanish, red.....(range 0.19– 0.54)	0.35	1.51 (2.79–0.98)
Spanish, white...(range 0.27– 0.62)	0.42	1.24 (1.96–0.86)
Sparkling, French and German....(range 0.13– 1.95)	0.53	1.00 (4.08–0.27)
Swiss, red.....(range 0.10– 0.27)	0.13	4.08 (5.30–1.96)
Swiss, white.....(range 0.08– 0.38)	0.10	5.30 (6.63–1.40)
Virginia.....(range 0.06– 1.23)	0.16	3.31 (8.83–0.43)
Sweet wines		
California Port...(range 0.23–13.56)	4.76	0.11 (2.31–0.04)
California Madeira and Sherry...(range 0.12–17.21)	5.38	0.10 (4.42–0.03)

Wines and Other Beverages	Gms. reducing sugars per 100 c.c.	Volume in liters supplying same amount of carbohydrates as 10 gms. wheat bread
Sweet Wines		
French.....(range 0.73–12.40)	5.38	0.10 (0.73–0.04)
German.....(range 0.64–12.13)	4.60	0.12 (0.83–0.04)
Madeira.....(range 2.48– 3.88)	2.95	0.18 (0.21–0.14)
Malaga.....(range 12.50–25.20)	18.32	0.03 (0.04–0.02)
Marsala.....(range 2.67– 8.24)	3.25	0.16 (0.20–0.06)
Port.....(range 3.76– 8.17)	6.04	0.09 (0.14–0.06)
Rhine.....(range 1.82–10.69)	6.35	0.08 (0.29–0.05)
Sherry.....(range 0.52– 4.80)	2.54	0.21 (1.02–0.11)
Sparkling, American.....(range 6.51–12.02)	8.28	0.06 (0.08–0.04)
Sparkling French and German....(range 8.00–18.50)	10.92	0.05 (0.07–0.03)
Tokay, true.....(range 1.86–20.50)	12.62	0.04 (0.28–0.03)
Tokay, commercial.....(range 2.70–40.70)	19.80	0.03 (0.20–0.01)
Vermouth.....(range 3.47–14.39)	9.46	0.06 (0.15–0.04)
Other Alcoholic Beverages		
Brandy, Gin, Rum and Whiskey.....	0	
Absinth.....	trace	
Angostura.....	4.2	126
Beer.....	4.5	118
Weiss bier.....	4.6	115
Ale.....	5.1	104
Porter or Stout.....	7.0	76
Malt extract, commercial.....	10.6	50
Curaçao.....	25.5	21
Crême de Menthe.....	27.7	19
Kümmel.....	31.2	17
Benedictine.....	32.6	16
Anisette.....	34.4	15
Chartreuse.....	34.4	15
Maraschino.....	52.3	10
Malt extract, true.....	71.3	7

CHAPTER VIII

TESTS

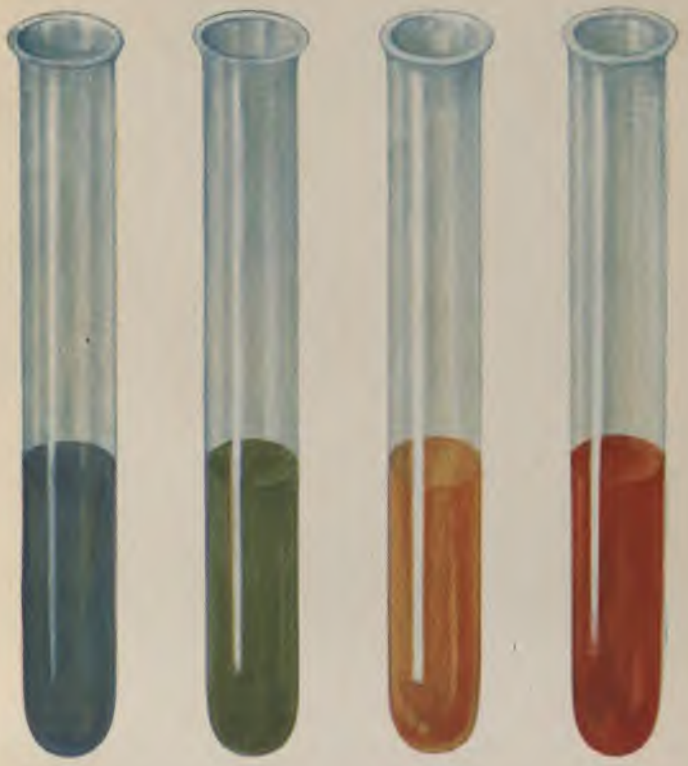
Each patient should learn to perform the ordinary tests for sugar with Benedict's solution, for acetone with sodium nitroprusside, and for diacetic acid with ferric chloride solution. These tests serve as a check on the diet the patient is using by indicating whether it is being tolerated and whether the patient is free from acid intoxication—that much feared bugaboo which must be eliminated in each case before it reaches sufficient proportions to endanger the life of the patient from diabetic coma.

Benedict's Test for Sugar in the Urine

Apparatus: Large test tube
Test tube holder
Medicine dropper
Bunsen burner for alcohol lamp

Reagent: Benedict's qualitative solution

Copper sulphate (crystals).....	17.3 gms.
Sodium potassium citrate.....	173.0 gms.
Sodium carbonate (crystals).....	200.0 gms.
Distilled water to make.....	1000.0 c.c.



1 2 3 4

PLATE I

1. Specimen Showing Absence of Sugar.
2. Specimen Showing Trace to Fraction of a Per Cent. of Sugar.
3. Specimen Showing Moderate Amount of Sugar (2 to 3 Per Cent.).
4. Specimen Showing Large Amount of Sugar (4 to 6 Per Cent.).

The copper sulphate, dissolved in about 100 c.c. of distilled water, is slowly poured into the sodium potassium citrate and sodium carbonate previously dissolved in about 200 c.c. of hot distilled water. The mixture should be stirred constantly while the copper sulphate is being poured in. The mixture is allowed to cool and is then diluted to 1 liter.

TECHNIQUE. Place about 5 c.c. (⅙ oz.) of Benedict's qualitative solution in the test tube and bring to the boiling point over the flame. Add 8 to 10 drops of the urine and boil for two minutes. Cool at once under running water. The presence of sugar is indicated if the fluid becomes opaque and changes in color from blue to a yellowish green, orange or brick-red, depending upon the quantity of sugar present. Absence of sugar is indicated if the solution remains clear and does not change color. (See plate I.)

BENEDICT'S QUANTITATIVE DETERMINATION OF SUGAR IN THE URINE

APPARATUS: 100 c.c. graduate
50 c.c. burette
Porcelain evaporating dish

Stirring rod
Metal stand
Bunsen burner or alcohol lamp
25 c.c. pipette

REAGENTS: Powdered pumice
Sodium carbonate
Benedict's quantitative solution

Copper sulphate (crystals).....	18.00	gms.
Sodium carbonate (crystals).....	200.00	gms.
Sodium or potassium citrate	200.00	gms.
Potassium sulphocyanate.....	125.00	gms.
5 per cent. potassium ferrocyanide solution.....	5.00	c.c.
Distilled water to make.....	1000.00	c.c.

Dissolve the copper sulphate in about 100 c.c. of distilled water; dissolve the sodium carbonate, sodium or potassium citrate and potassium sulphocyanate in about 800 c.c of water. Heat the liquid composed of the latter solution; if it is not quite clear filter it. Pour the dissolved copper sulphate slowly into the other solution, stirring constantly. Add the ferrocyanide solution; cool and dilute the liquid thus obtained with distilled water to 1000 c.c. Twenty-five c.c. of this reagent are reduced by 50 mgs. of glucose.

TECHNIQUE. Measure 25 c.c. of Benedict's

quantitative solution into the evaporating dish by means of the pipette; add 10 to 20 gms. of crystallized sodium carbonate and a little powdered pumice. Heat the mixture over the free flame until the carbonate is dissolved; then let the urine (usually diluted 1:10 unless it is expected that the sugar content will be very low) run into this mixture from the burette—rather rapidly at first, then more slowly as the color begins to disappear. When the color is completely obliterated the action is terminated. During the entire titration, the fluid, which is stirred constantly, should be kept boiling continuously. Any quantity of the liquid which is lost by evaporation is replaced from time to time.

CALCULATION. If the urine has been diluted 1:10, the percentage is obtained as follows: $\frac{0.050}{X} \times 1000$ = percentage of sugar in the undiluted specimen, X being the number of cubic centimeters of diluted urine required to produce the complete reaction.

EXAMPLE. If 14 c.c. of diluted urine were used to produce a complete reaction,

Then, $\frac{0.050}{X} \times 1000 = 3.571$ per cent.

Rapid Test for Estimating Sugar in the Urine

The following simple test has been devised for the quantitative estimation of sugar.[1] It is less complicated than the Benedict test and differs from it in accuracy only—a few points in the decimal place.

Apparatus: Large test tube
Metal test tube holder
Medicine dropper
Bunsen burner or alcohol lamp

Reagents: Specially prepared sugar test tube
Bicarbonate of soda tablets

Technique. While holding the sugar test tube in a perpendicular position, tap the side of the tube until all the liquid has dropped from the upper end. File off the upper end of the tube; insert the opened end into a large test tube, then file off the other end of the tube containing the special solution. This maneuver will cause the liquid in the sugar test tube to flow freely into the large test tube. Drain all the liquid into the large tube. Crush one of the bicarbonate of soda tablets in a piece of

[1] This test has been developed by the Franco-American Ferment Company.

paper; add this powder to the liquid in the test tube and bring the entire contents of the test tube to the boiling point over the flame. Add the urine drop by drop, keeping the solution boiling and in motion until the solution begins to lighten in color, signifying the approach of the complete reaction. From now on, add the urine very slowly, since only one drop is needed to decolorize the liquid completely and leave a white precipitate.

CALCULATION. Divide 10 by the total number of drops of urine required for decolorization. This result gives the percentage of sugar in the urine.

The following tabulations made by my laboratory assistant, Sylvia Carter, give an accurate comparison of the results obtained with the Benedict quantitative test and this rapid test:

Specimen	Benedict Test Per Cent.	Rapid Test Per Cent.
1	0.53	0.50
2	0.48	0.50
3	0.80	0.83
4	0.14	0.25
5	4.20	3.03
6	0.84	0.76
7	5.55	5.00
8	0.81	0.76
9	2.55	2.50
10	1.98	1.66

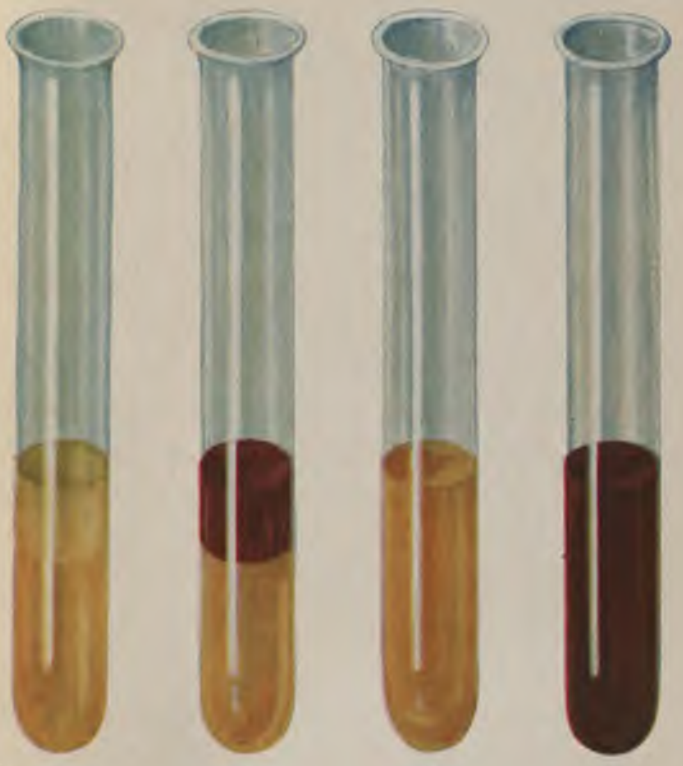
Test for Acetone with Sodium Nitroprusside

Apparatus: 1 test tube

Reagents: Sodium nitroprusside (crystals)
Glacial acetic acid
Strong ammonium hydroxide

Technique. Place about 5 c.c. of urine in an ordinary test tube and add 3 to 5 drops of glacial acetic acid. Shake the tube thoroughly; then add 1 to 2 small crystals of sodium nitroprusside and shake until this is dissolved. These reagents will give the urine a faint brown color. Stratify the solution with strong ammonium hydroxide, using from one-half to one c.c.

A purple ring appearing at the juncture of the fluids constitutes a positive reaction. Deep reddish-yellow and brown rings at the point of juncture are not indicative of acetone. In a very rough way, the quantity of acetone may be estimated by the depth of the color. In order to estimate this roughly, after the ammonium hydroxide has been added, shake the solution well in order to mix the ammonium hydroxide with the upper portion of the urine. The upper half of the liquid will then take on a purple-red



1 2 3 4

PLATE II

1. Specimen Showing Absence of Acetone.
2. Specimen Showing Large Amount of Acetone.
3. Specimen Showing Absence of Diacetic Acid.
4. Specimen Showing Large Amount of Diacetic Acid.

color, if acetone be present, and the depth of the color will depend upon the amount of acetone in the urine. A trace of acetone is indicated by a faint purplish hue; a large amount bv a deep purple-red color that is not transparent to light. (See Plate II.)

Test for Diacetic Acid with Ferric Chloride

Apparatus: Test tube.

Reagent: Ferric chloride solution.

Technique. To about 5 c.c. of urine in a test tube, add the ferric chloride solution drop by drop. The urine may become milky at first, due to the precipitation of phosphates, but this milkiness will disappear on the addition of more ferric chloride. If diacetic acid is present, the solution will assume a "Burgundy red" color, the depth of the shade depending upon the amount of diacetic acid present. (See Plate II.)

The examination of the blood to determine the sugar content is a very important procedure since the necessity for keeping the percentage of blood sugar within normal limits is the factor which determines the quantity and variety of

the diet which the doctor can safely prescribe. From these findings, also, the doctor is able to determine the tolerance of the patient for the diets prescribed. The diet can then be increased or decreased as indicated by the needs of the patient.

In severe cases of diabetes, especially if Bright's disease is present, it is doubly important to determine the amount of sugar in the blood, since in many instances, although the amount of sugar in the patient's blood is high, an examination of the urine shows only a trace of sugar, in some cases none at all, owing to the impermeability of the kidneys. With the absence of glycosuria in the urine, one is often tempted to increase the diet; this would be a very serious mistake if the blood sugar were high. Large amounts of sugar in the blood over a continued period, especially if associated with Bright's disease and arteriosclerosis, may be responsible for retinal hemorrhage and destruction of sight. Again, if there be large amounts of sugar in the blood and none appear in the urine, there is also a possibility of acidosis although the ketone bodies may not have been

detected due to the impermeability of the kidneys. In such cases, therefore, the amount of sugar in the blood may be taken as an index of the necessity for making a carbon dioxide tension test to find out whether or not the patient is threatened with coma.

For the detection of sugar in the blood, I employ two tests—the Benedict-Lewis and the Epstein-micro. The particular test to be adopted by the doctor will depend upon the laboratory facilities he has at his disposal.

The Benedict-Lewis test is intended strictly for laboratory use whereas the Epsten-micro test can be carried out in the office or at the bedside.

BENEDICT-LEWIS TEST FOR BLOOD SUGAR

APPARATUS: Pipettes 1.2 and 3 c.c.
50 c.c. centrifuge tube
Colorimeter
Hot water bath
Filter paper and funnel
2 graduates, either 10 or 25 c.c.

REAGENTS: Picric acid
10 per cent. sodium carbonate solution
Sugar standard solution

TECHNIQUE: Pipette into the centrifuge tube 2 c.c. of oxalated blood. With the same pipette add 8 c.c. of distillated water. This gives a dilution of 1:4. After allowing the corpuscles to lake, add about 0.5 gram of picric acid; mix these together thoroughly and allow the solution to stand for several minutes. Then centrifuge and filter the supernatant fluid through dry filter paper. Prepare "Standard" and "Unknown" solutions as follows:

Standard

1. Pipette 3 c.c. of the sugar standard solution into a graduate.
2. Pipette 1 c.c. of 10 per cent sodium carbonate solution into the same graduate.

Unknown

1. Pipette 3 c.c. of filtrate into the graduate.
2. Pipette 1 c.c. of 10 per cent sodium carbonate into the same graduate.

Boil both graduates in a hot water bath for 15 minutes; allow the solutions to cool, then dilute each solution with distilled water to the level marked 10 on the graduate. Place the two solutions in the cups of the colorimeter and take the readings.

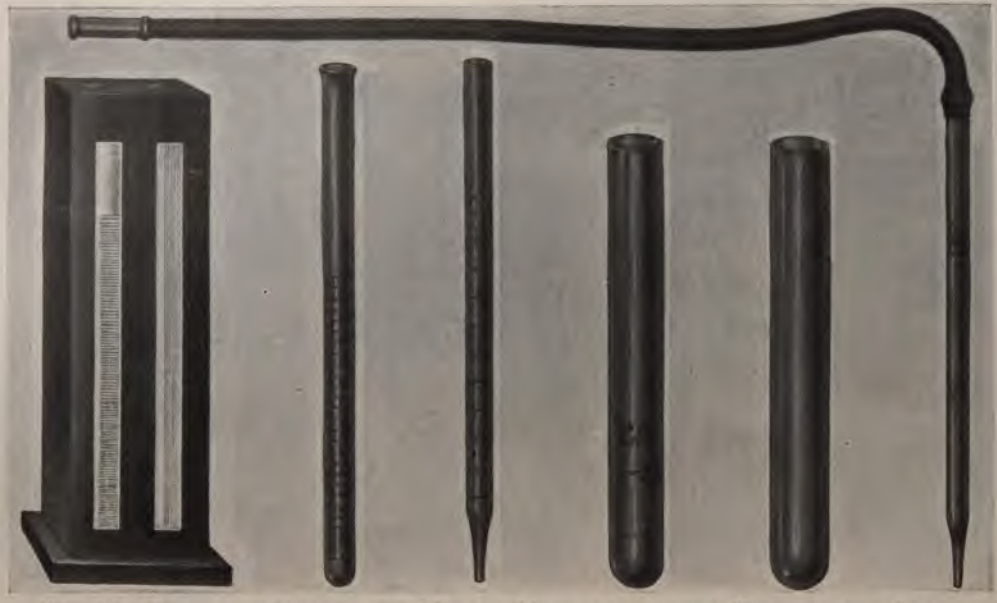


Fig. 27.—Epstein Apparatus for Making Microcolorimeter Tests on the Blood.

CALCULATION. By formula

$$X = \frac{S}{R} \times \frac{M}{W} \times 100 \text{ or } X = \frac{S}{R} \times 100$$

X = Mgs. of sugar per 100 c.c. of blood
S = Reading of the standard 10/00
M = Concentration of the standard solution = 0.6
R = Reading of the unknown
W = Amount of the blood used = 0.6 c.c.

THE EPSTEIN MICRO TEST

APPARATUS: Epstein blood sugar apparatus
Bunsen burner or alcohol lamp.
Filter paper

REAGENTS: Distilled water
Picric acid, saturated solution
Sodium carbonate, 10 per cent. solution
Potassium oxalate, 20 per cent solution

TECHNIQUE. Place two drops of the 20 per cent. oxalate solution in the graduated test tube. By means of the blood pipette draw 0.2 c.c. of blood from the finger and discharge it into the tube containing the oxalate solution. Rinse the pipette

two or three times by running distilled water through the tube, then add distilled water up to the 1.0 c.c. mark. After allowing the blood to lake, add picric acid drop by drop up to the 2.5 c.c. mark, shaking the tube gently as each drop is added. Mix the solution thoroughly by shaking; then filter it through the filter paper. One c.c. of the filtrate is placed in a plain tube and heated carefully over the free flame until all save two or three drops have evaporated. At this point one half c.c. of the 10 per cent. solution of sodium carbonate is added, and the tube is heated again until the contents of the tube is concentrated into a drop or two. When the color of the fluid changes from a light yellow to a deep red-brown, the reaction is completed. Now add three or four drops of distilled water to the tube and heat gently. Transfer the contents to the graduated tube of the hemoglobinometer. Rinse the tube used for boiling two or three times with water (using only three or four drops at a time), adding the solution in each case to the hemoglobin tube. The tube should be warmed each time before transferring the contents. The volume in the graduated hemoglobin tube is made up

to the 50 mark and the color of the resulting solution compared with the two standard tubes *A* and *B* of the set. The tube which the liquid compares with most closely is used as a standard. The solution in the graduated tube is then diluted with water gradually until the two colors match.

CALCULATION. Using the lighter standard tube *A*:

$$\frac{X}{1000} = \text{per cent. of sugar.}$$

Using the darker standard tube *B*:

$$\frac{X \times 2}{1000} = \text{per cent. of sugar}$$

APPENDIX

TABLES AND WEIGHTS

The metric system of weights is used in the preparation of diabetic diets in order to simplify the computation of the percentages of the various constituents in the foods. It is advisable, therefore, for the patient to become familiar with the various methods of measurement.

Comparative Values of Avoirdupois and Metric Weights

28.35 gms.	=	1 ounce
50.00 gms.	=	1 ounce 334 grains
100.00 gms.	=	3 ounces 230 grains
150.00 gms.	=	5 ounces 127 grains
200.00 gms.	=	7 ounces 24 grains
250.00 gms.	=	8 ounces 358 grains
300.00 gms.	=	10 ounces 255 grains
350.00 gms.	=	12 ounces 152 grains
400.00 gms.	=	14 ounces 48 grains
450.00 gms.	=	15 ounces 382 grains
500.00 gms.	=	17 ounces 279 grains
550.00 gms.	=	19 ounces 175 grains
600.00 gms.	=	21 ounces 72 grains
650.00 gms.	=	22 ounces 405 grains
700.00 gms.	=	24 ounces 303 grains
750.00 gms.	=	26 ounces 198 grains
800.00 gms.	=	28 ounces 96 grains

850.00 gms. = 29 ounces 429 grains
900.00 gms. = 31 ounces 326 grains
950.00 gms. = 33 ounces 222 grains
1000.00 gms. = 35 ounces 120 grains

Comparative Values of Metric and Apothecaries' Measures

0.25 c.c. = 4.06 minims
0.50 c.c. = 8.11 minims
1.00 c.c. = 16.23 minims
2.00 c.c. = 32.40 minims
3.00 c.c. = 48.60 minims
4.00 c.c. = 64.80 minims
5.00 c.c. = 1.53 fluid ounces
6.00 c.c. = 1.62 fluid ounces
7.00 c.c. = 1.98 fluid ounces
8.00 c.c. = 2.16 fluid ounces
9.00 c.c. = 2.43 fluid ounces
10.00 c.c. = 2.71 fluid ounces
25.00 c.c. = 6.76 fluid ounces
30.00 c.c. = 1.01 fluid ounces
50.00 c.c. = 1.69 fluid ounces
75.00 c.c. = 2.53 fluid ounces
100.00 c.c. = 3.38 fluid ounces
200.00 c.c. = 6.76 fluid ounces
300.00 c.c. = 10.14 fluid ounces
400.00 c.c. = 13.53 fluid ounces
500.00 c.c. = 16.90 fluid ounces
600.00 c.c. = 20.29 fluid ounces
700.00 c.c. = 23.67 fluid ounces
800.00 c.c. = 27.67 fluid ounces
900.00 c.c. = 30.43 fluid ounces
1000.00 c.c. = 33.81 fluid ounces

TABLE OF EQUIVALENT MEASURES (APPROXIMAT

1 teaspoonful	=	5.00 c.c. or ⅙ fluid ounce
1 dessertspoonful	=	10.00 c.c. or ⅓ fluid ounce
1 tablespoonful	=	15.00 c.c. or ½ fluid ounce
1 ordinary cup	=	250.00 c.c. or 8 fluid ounces
1 glass	=	250.00 c.c. or 8 fluid ounces
1 cordial glass	=	20.00 c.c. or ⅔ fluid ounce
1 sherry glass	=	30.00 c.c. or 1 fluid ounce
1 cocktail glass	=	75.00 c.c. or 4 fluid ounces
1 claret glass	=	120.00 c.c. or 2½ fluid ounc
1 champagne glass	=	135.00 c.c. or 4½ fluid ounc

INDEX

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NAME	DATE DUE
Amy G. Pope	NOV 28 1921
R M Cooper	JAN 19 1922
M. Takahashi	JUL 27 1922
Dr. Williams (per Mrs. Williams)	MAY 11 1925
J Muilen	JAN 26 1932